VOLUME XLI NUMBER TWO

THE NATIONAL GEOGRAPHIC MAGAZINE

FEBRUARY, 1922

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Our Map of the Countries of the Caribbean

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IMMEDIATELY after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resultant given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

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THE Society also had the honor of subscribing a substantial sum to the historic expedition of Admiral Peary, who discovered the North Pole.

NOT long ago The Society granted $25,000, and in addition $75,000 was given by individual members through The Society to the Federal Government when the congressional appropriation for the purchase was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people and incorporated into a National Park.

THE Society is conducting extensive explorations and excavations in northwestern New Mexico, which was one of the most densely populated areas in North America before Columbus came, a region where prehistoric peoples lived in vast communal dwellings whose ruins are ranked second to none of ancient times in point of architecture, and whose customs, ceremonies and name have been engulfed in an oblivion more complete than any other people who left traces comparable to theirs.

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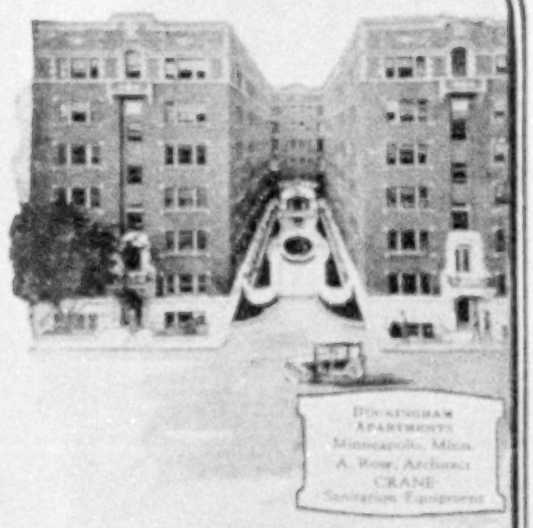

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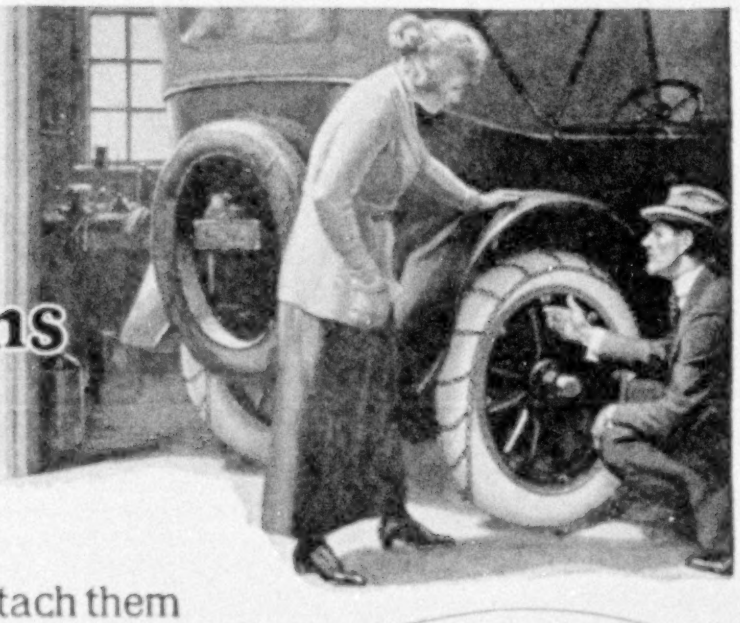
Practice putting on- WEED Tire Chains in the Garage



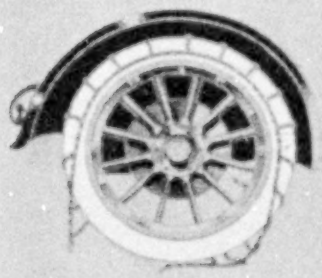
It only takes a few moments to attach them when you know how. No jack required. Study the directions, illustrated on the right.

Women drivers are very numerous nowadays. They are driving out into the country over all sorts of roads—*they surely need protection against the dangerous skid.* How many of them know how to put on Weed Chains? Have you ever instructed your wife, your sister or your daughter?

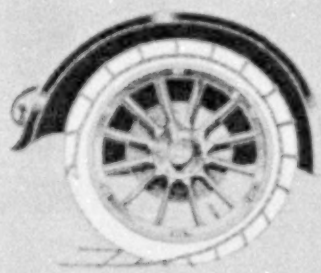
The directions for attaching Weed Chains are simple yet most important.

Avoid annoyances on the road — learn how easy it is to put them on correctly—*practice in the garage* and give the women instruction. It will amply repay you in security, satisfaction and comfort.

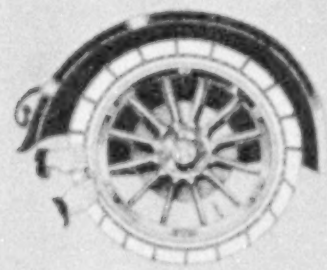
Observe these three fundamentals



Lay chains over wheel with hooks toward rear, and tuck the slack under front part of wheel.



Start car forward just enough to run over slack ends.



Hook chains as tightly as possible by hand.

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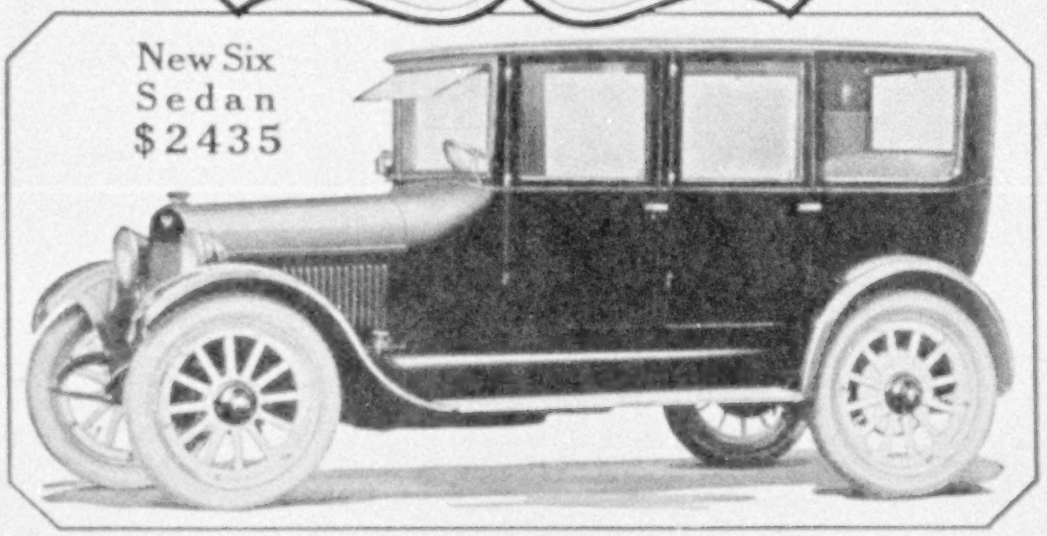

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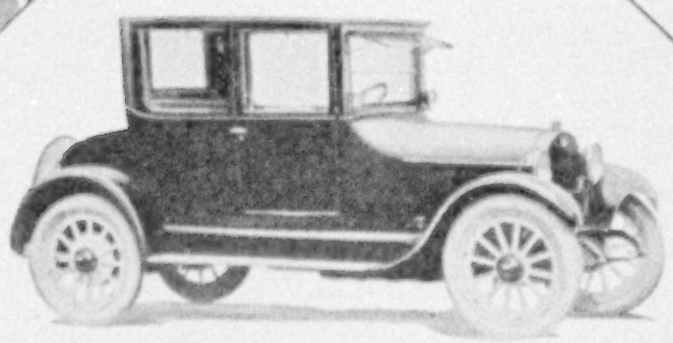

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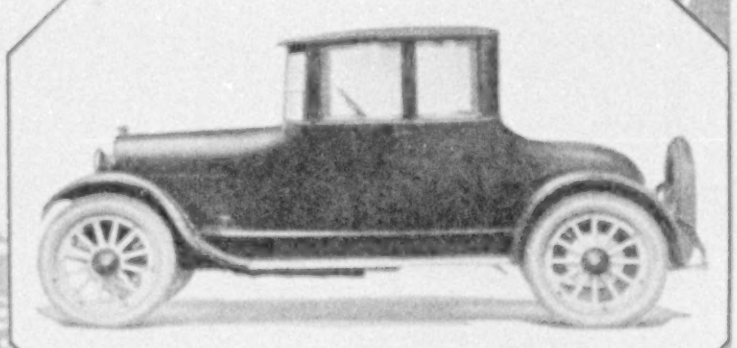
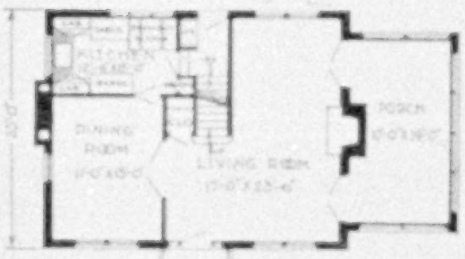
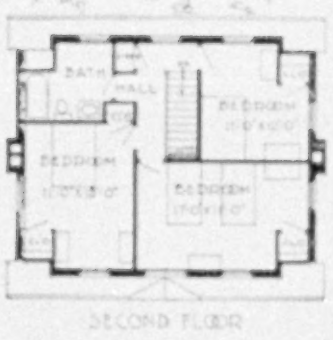


New Business Coupe—$1895





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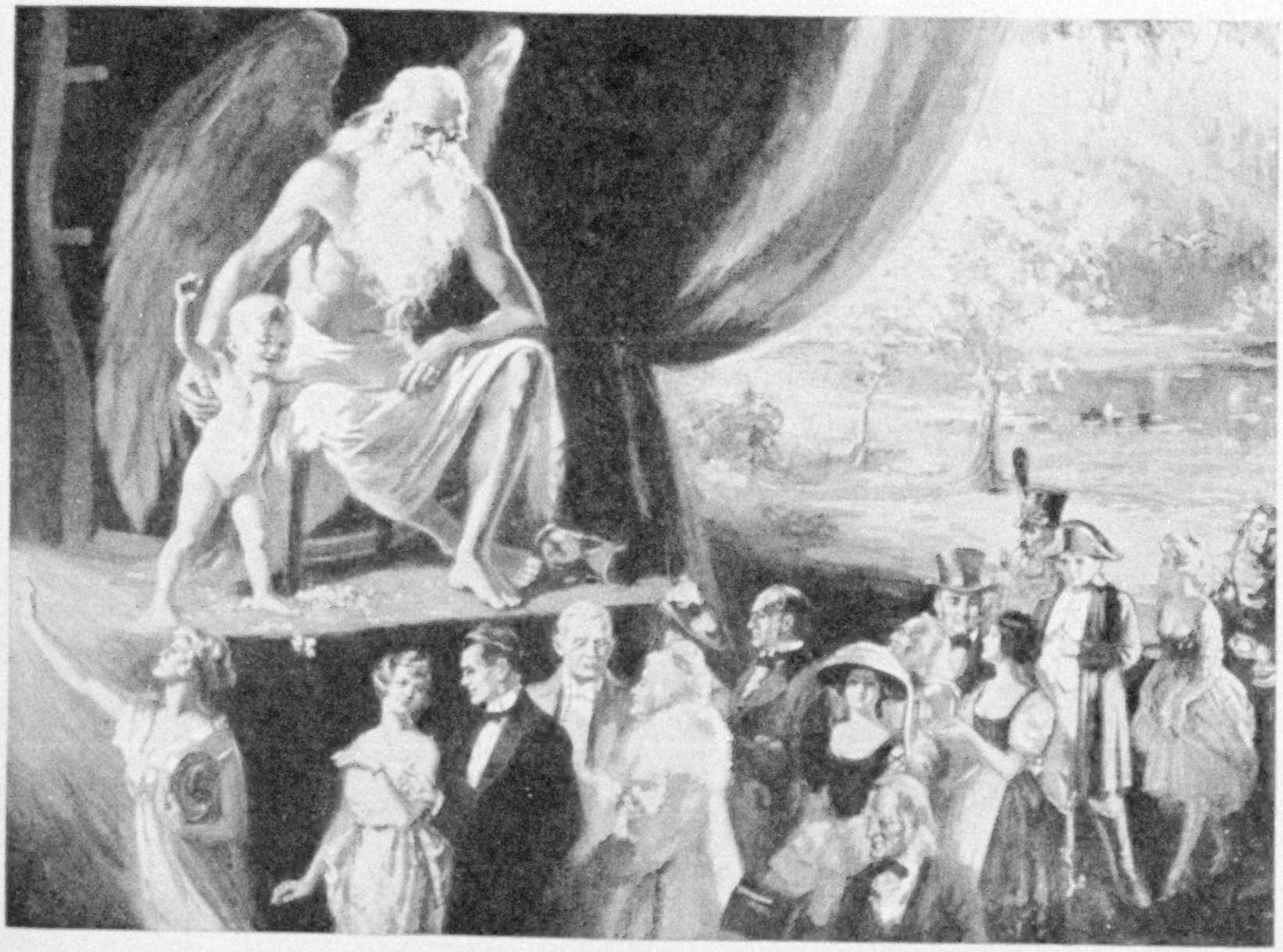

The Pageant of Time

By Krónos

BACKWARD, turn backward, O Time! Bring the Keepers of Minutes before us
—Passing in endless review, like a backwardspun film of the ages;
Guardians of Life's priceless hours, by their Maker entrusted to mortals—
All who have served thee most faithfully, back unto aeons forgotten!

Time waves a beckoning hand, with Life standing eager beside him.
Time turns the centuries back, like the hands of a watch in the winding.
Lo! What a myriad throng from the mists of the morning emerging—
See all the Keepers of Time, filing past in the march of the ages!

Far, far away in the land of the dinosaur, dragon and mammoth,
Back in that dim, distant dawn when creation steamed hot from the making,
See how the Cave-Man looks up from the rope over which he is musing,
Slow-burning marker of Time—in an age when Time groped for expression.

Babylon's ancient high priest, the wise and resourceful Berosus,
Points with the pride of a king to the shaft of the first brazen Sun-Dial.
Hark! In the Dance of the Hours, behold golden Greece in her glory,
Thrilled by the music and moonlight that flood the dim shrine of the Hour-Glass.

Borne high aloft by a slave, the ponderous gong of old Egypt
Throbs to the Water-Clock's warning that wing-footed daylight is passing.
Alfred the Great brings his Time-Candle, notched to betray how the minutes
(Counted by him in his wisdom as mortals' most priceless possession)

Ever and ever fled on. And near him the Barefooted Friar
Henlein, the fugitive craftsman whose Watch brought him pardon and honor.
Mark, too, the Nuremberg Egg, whose single hand, silently pointing,
Warned the Franconian lovers of gates grimly closing at midnight.

Boldly the swart buccaneer limps alongside his gleaming Sun-Cannon.
Hand in hand facing the future, Galileo and Marina Gamba
—With soft footfall, measured and slow, like the swing of the great lamp at Pisa—
March through the sorrows of life, linked by love even Time cannot alter.

Heedless of honor and fame, the squealing and struggling porker,
Shrilly lamenting the bristles that furnished Time's earliest Hair-springs,
Draws not so much as a glance from the dark eyes of Nicolas Facio,
Rapt, like the maid at his side, in the variant beauties of Jewels.

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Caron de Beaumarchais bends his gaze
to fair Pompadour's Ring-Watch
—Keyless, yet key to the power which
he sought in the gay court of
Louis.
Charlotte of England, her queenly hand
swinging her watch on its pendant,
Offers a sovereign's thanks for the
gift of the Lever Escapement.

Sliver the Midshipmite carries before
him, on cushion of satin,
Harrison's wondrous Chronometer,
source of a new navigation.
Sternly the Clockmakers' Company
head unto death is condemning
Watches "deceitful"; the smith's
mighty sledge shall reduce them
to powder.

Head bent and chin upon breast, the
fearless and restless Napoleon
Swings in the stride that rewinds his
treasured Pedometer Timepiece.

Near him the Alpine inspector, his
tongue ever busy with watches,
Chafes as his wayward thoughts stray
to the mountaineer's rosy-cheeked
daughter.

Here on our own native shores, the
courtly and far-visioned Raymond
Gives to his own generation America's
Standardized Timepiece.

Youth and Old Age of Today, their
exquisite Elgins displaying,
Marvel at Time's paradoxical flight—
ever swift, ever dragging.
Proudly the Spirit of Progress, her
eager face brightly illumined
By visions of Elgins to come, hastens
on to the Dawn of Tomorrow.

THUS before old Father Time trails
the slow, endless pageant of ages.
All that is best in its toil and its
genius he thankfully gives us
Now in the Watch of Today—in Elgin,
the Timepiece of *all* Time.

What of the Watch
of the Future?
Though its *form*
is yet shrouded
in shadows,
Of its *source* Father
Time has no
doubt. *He knows
it will still be—an
Elgin!*

EDITORIAL NOTE: This illustration—which reviews in panorama form the Elgin art panels of the past twenty-four months—is a miniature reproduction of DeLay's mural painting, "The Pageant of Time." It appears in full colors in the forthcoming de Luxe edition of Elgin's classic volume now on the press, "Through the Ages With Father Time."

Further announcement will be made when the finished book is ready for the art-loving public.

Watches

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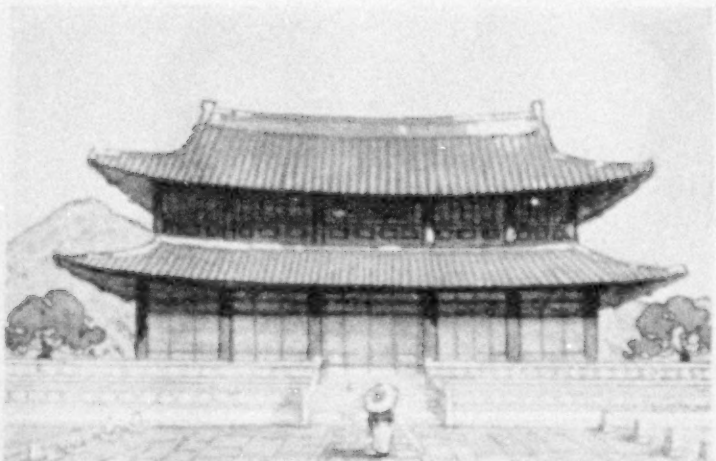

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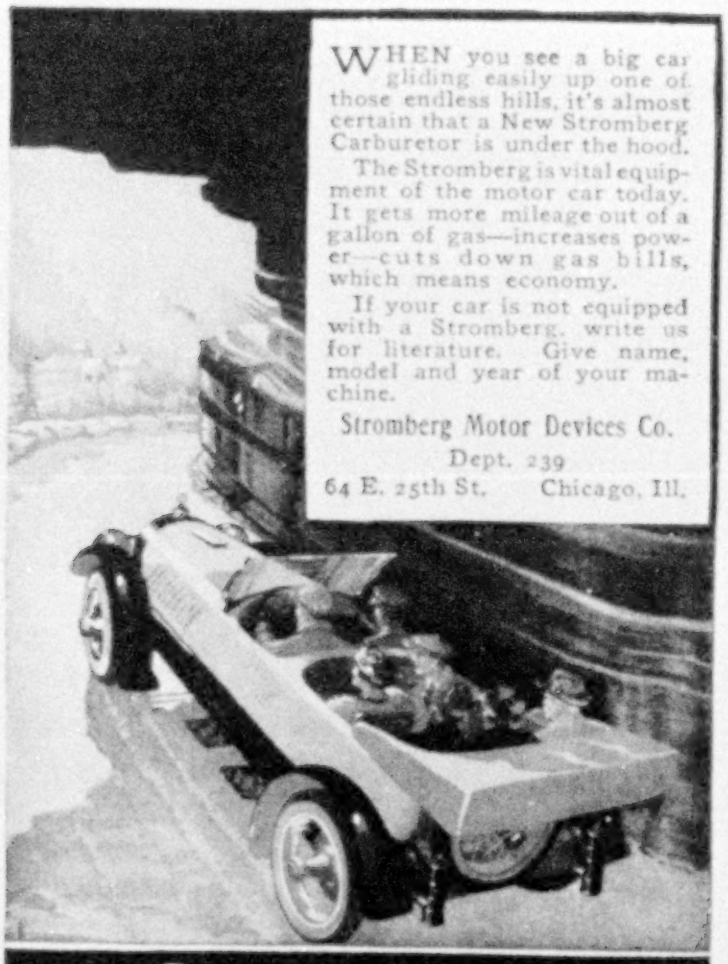

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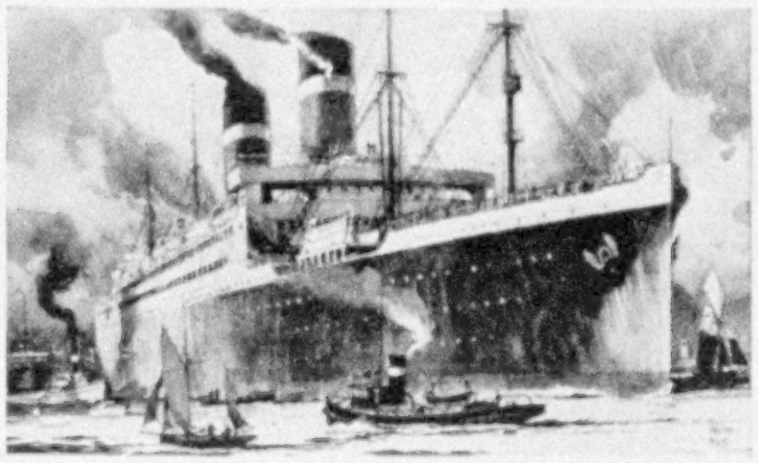

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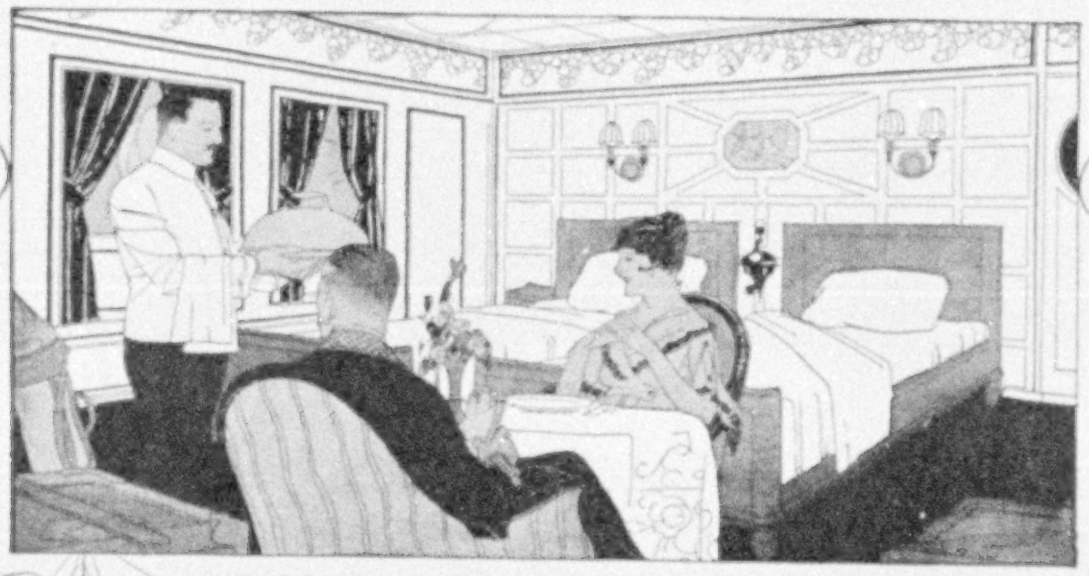

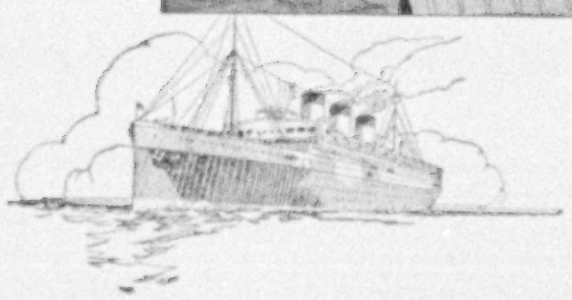

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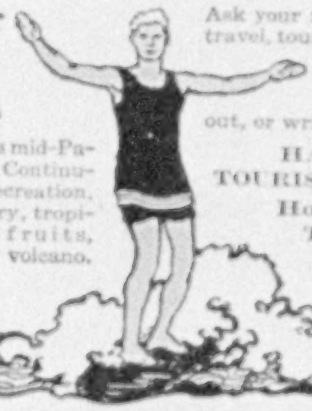

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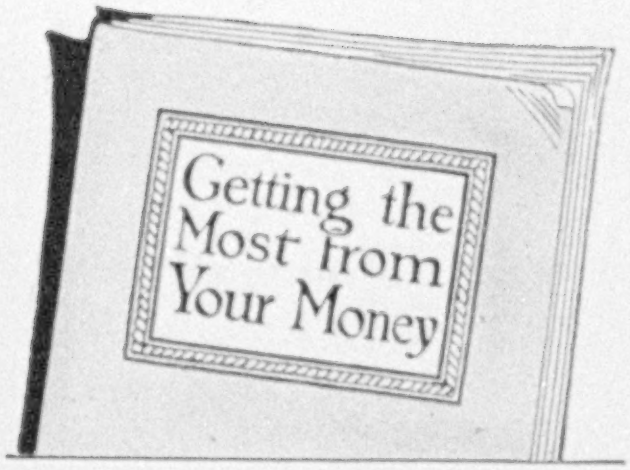

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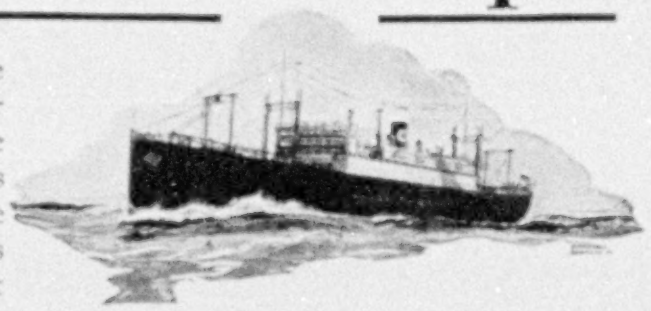

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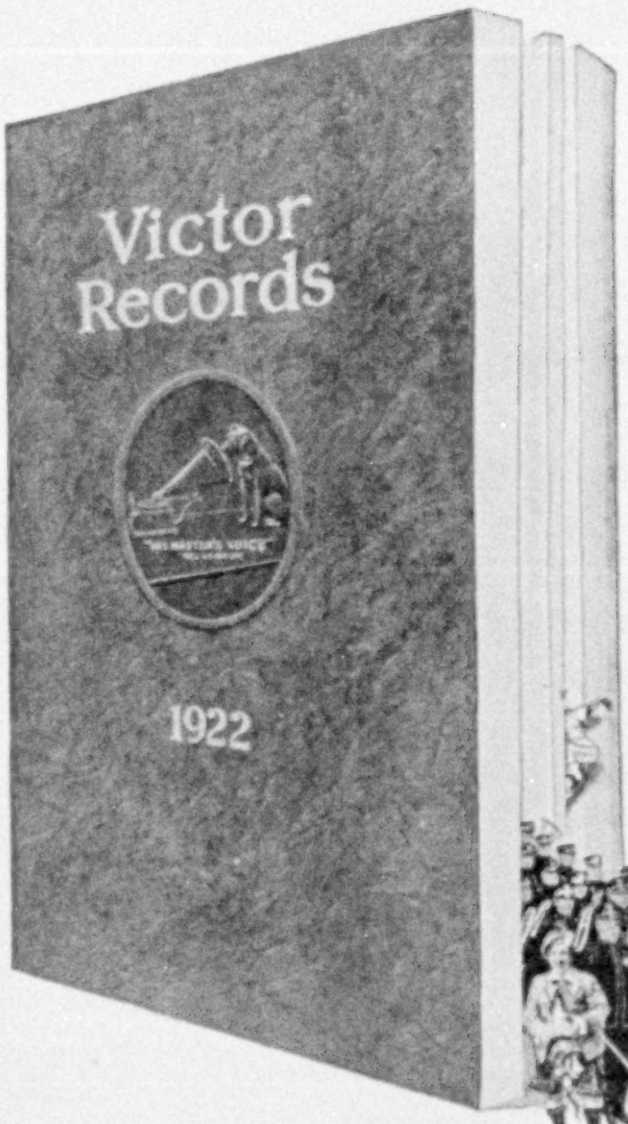

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VOL. XLI, No. 2 WASHINGTON FEBRUARY, 1922

THE NATIONAL GEOGRAPHIC MAGAZINE

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THE FOREMOST INTELLECTUAL ACHIEVEMENT OF ANCIENT AMERICA

The Hieroglyphic Inscriptions on the Monuments in the Ruined Cities of Mexico, Guatemala, and Honduras Are Yielding the Secrets of the Maya Civilization

BY SYLVANUS GRISWOLD MORLEY

CARNEGIE INSTITUTION OF WASHINGTON, AUTHOR OF "THE EXCAVATIONS AT QUIRIGUA, GUATEMALA," IN THE NATIONAL GEOGRAPHIC MAGAZINE

DURING the first millennium before Christ, while yet our own forebears of northern Europe were plunged in the depths of barbarism, there developed somewhere in Middle America, probably on the Gulf Coast of southern Mexico, a great aboriginal civilization called the Maya, which was destined to become the most brilliant expression of the ancient American mind.

Somewhat later, probably about the beginning of the Christian era, the Maya seem to have found their way into what is now the northern part of Guatemala, the Department of Peten, and the States of Chiapas and Tabasco, Mexico, and here for the next 600 years they flourished most amazingly. (See the supplementary map of "The Countries of the Caribbean.")

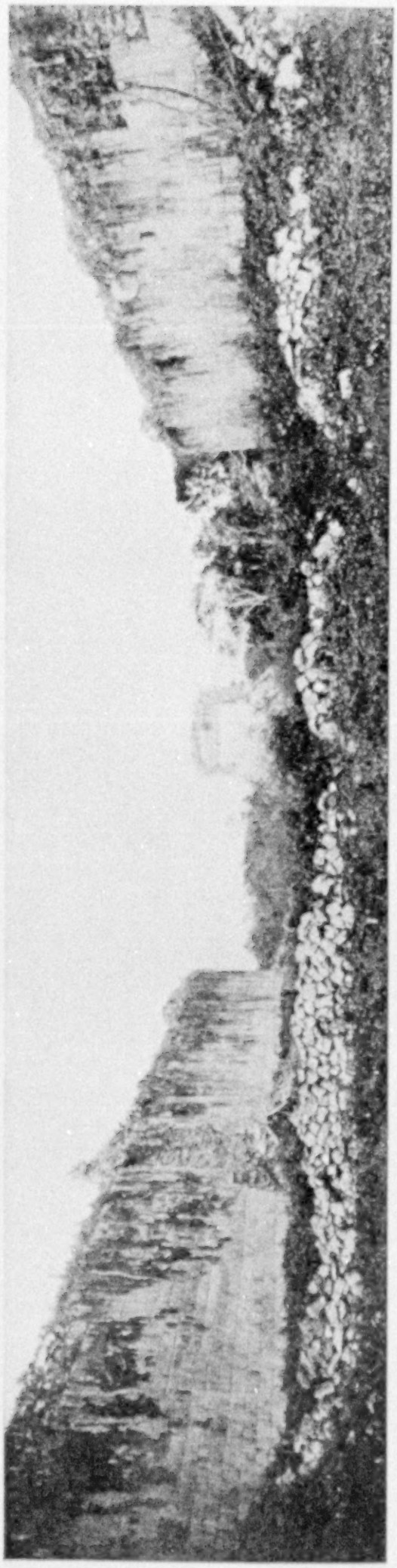
During these centuries this highly gifted people, not inaptly called "the Greeks of the New World," were slowly fighting upward from savagery through barbarism to the threshold of civilization.

Their priests and astronomers were gathering from the stars the secrets of time and its accurate measure, the revolutions of the sun, moon, and planets; their mathematicians and chronologists were devising a calendar and chronology which was without peer on this continent and excelled by none in the Old World at that time; their builders were developing an architecture at once unique, dignified, and beautiful; their sculptors were carving the most elaborate compositions and designs in stone; their leaders had mastered the problems of social and governmental organization and were administering the state adequately and well. In short, a great national life was quickening to its fullest expression.

The zenith of their civilization, however—indeed, the intellectual climax of all civilizations—was the development of a hieroglyphic writing which, moreover, was the only system of writing in the New World worthy of comparison with the earlier graphic systems of the Old World, such as those of Egypt, of Babylonia, and of China, for example.

MAYA WRITINGS TRANSFERRED TO STONE BEFORE THE BIRTH OF CHRIST

This hieroglyphic writing was doubtless first developed upon wood, fiber-paper or skins, but shortly before the be-



THE BALL COURT AT CHICHEN ITZA, YUCATAN

In this immense court, large as a foot-ball field, a game of ball was played called "tlachtli," not unlike our modern game of basket-ball. The player who succeeded in driving the ball through the ring attached to the center of each wall (that on the right is still in its original position) had forfeited to him by ancient custom of the game all the clothing and jewelry of the spectators.

ginning of the Christian era it was transferred to stone, inscribed upon monuments and altars, which were erected in the courts and plazas in front of the principal temples of the different Maya cities.

And here, buried in the vast tropical forests of northern Central America, and especially in the State of Guatemala, these splendid memorials of a forgotten people are slowly coming to light.

Year after year archæological expeditions sent out by American scientific institutions are penetrating deeper and deeper into these virgin fastnesses and are discovering new ruined cities, from the monuments and hieroglyphic inscriptions of which we are gradually reconstructing the outlines of ancient Maya history.

The only other business which brings man into these tropical forests of northern Guatemala is one of our most important American industries, what might be termed, perhaps, our national sport—chewing gum.

The principal ingredient of chewing gum is "chicle," which is obtained from a tree called the "chico-sapote," growing in these forests. Indeed, the archæologist is deeply indebted to the chicle business for bringing him first news of new cities found in the bush from time to time by the chicle-hunters.

The writer has a standing reward offered to all *chicleros* for "information leading to the capture, dead or alive," of any new group of ruins where there are hieroglyphic monuments, and already this expedient has resulted in the discovery of several important cities.

It is the chicle-operators who keep the trails open; who locate the water-holes for camping-places; who maintain mule-trains, the only means of transportation possible in the region; whose activities bring labor into the bush. In short, in this field, at least, the archæologist could scarcely pursue his profession were it not for our popular pastime of chewing gum. But to return to our subject.

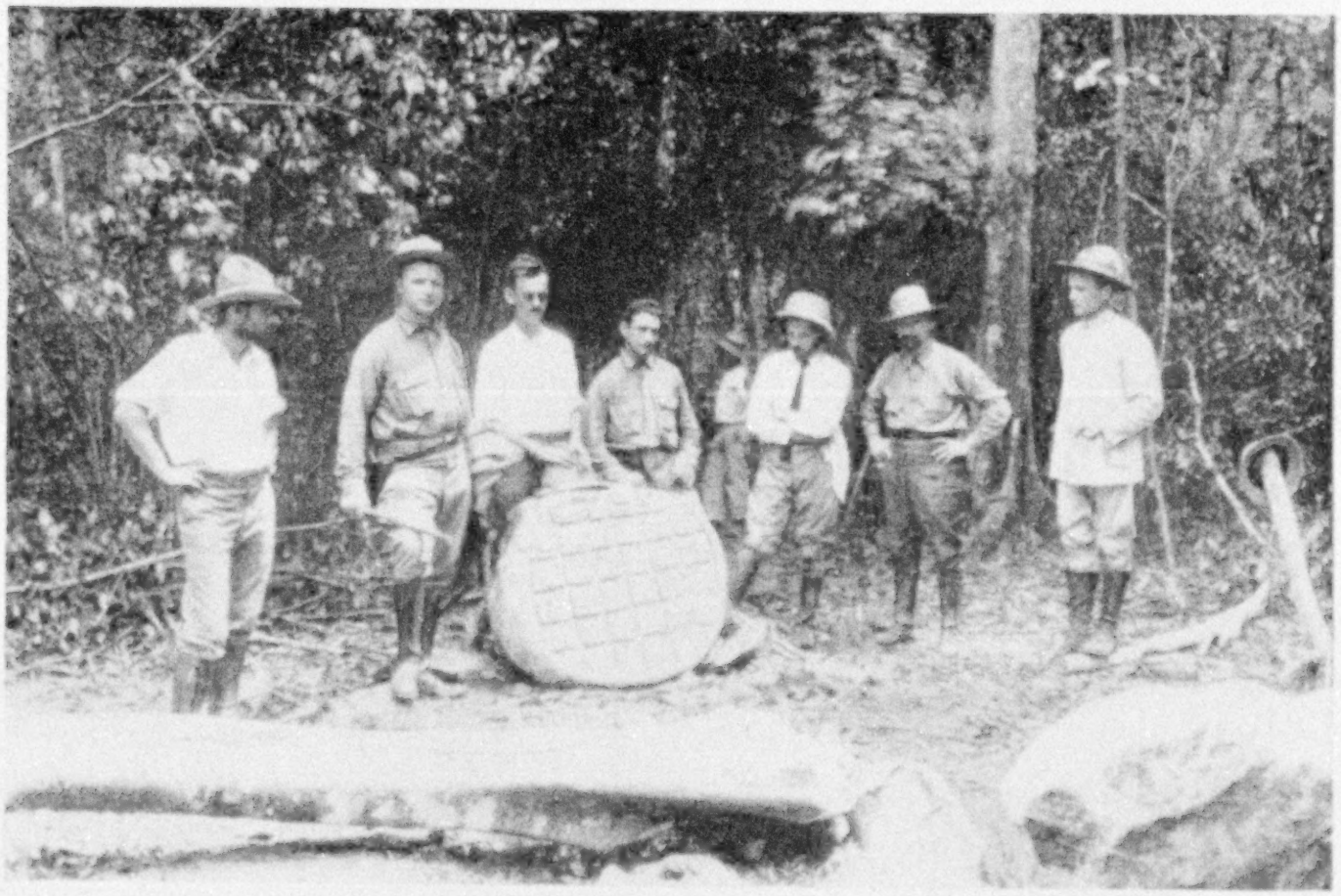
MAYA WRITING REPRESENTS TURNING POINT IN HUMAN HISTORY

The peculiar importance of the Maya hieroglyphic writing lies in the fact that it represents a stage in the science of

Courtesy of The Carnegie Institution of Washington

A CHICLE (CHEWING-GUM) CAMP IN A CLEARING IN THE FORESTS OF PETEN, GUATEMALA

These camps are located near aguadas, or water-holes, and are sometimes of a fairly permanent nature. The houses have palm-leaf thatched roofs and sides of boughs, and are thoroughly water-proof. A pile of chicle bales is seen in the foreground, each weighing from 100 to 150 pounds and being about the size of a large block of ice. The Carnegie Expedition's mule-train has just arrived at this camp; two mules are being unloaded at the left of the picture, and the table and cots are already set up for the night. Retiring in these forests is no light task, involving, as it does, the arrangement of an elaborate mosquito-netting and a search for stray insects with an electric torch before the process is complete.



Courtesy of The Carnegie Institution of Washington

AT THE RUINS OF IXLU, IN NORTHERN PETEN, GUATEMALA

The ruins of Ixlu were discovered on April 10, 1921. This photograph shows His Excellency Dr. José Prado Romaña, Governor of Peten; Mr. M. D. Bromberg, vice-president of the American Chicle Company, and several members of the Carnegie Central American Expedition staff on a visit of inspection to the newly discovered site, standing near one of the stone altars (see illustration on opposite page).

expressing thoughts by graphic symbols not exemplified by the writing of any other people, ancient or modern. It stands at that momentous point in the development of the human race where graphic symbols representing sounds were just beginning to replace symbols representing ideas.

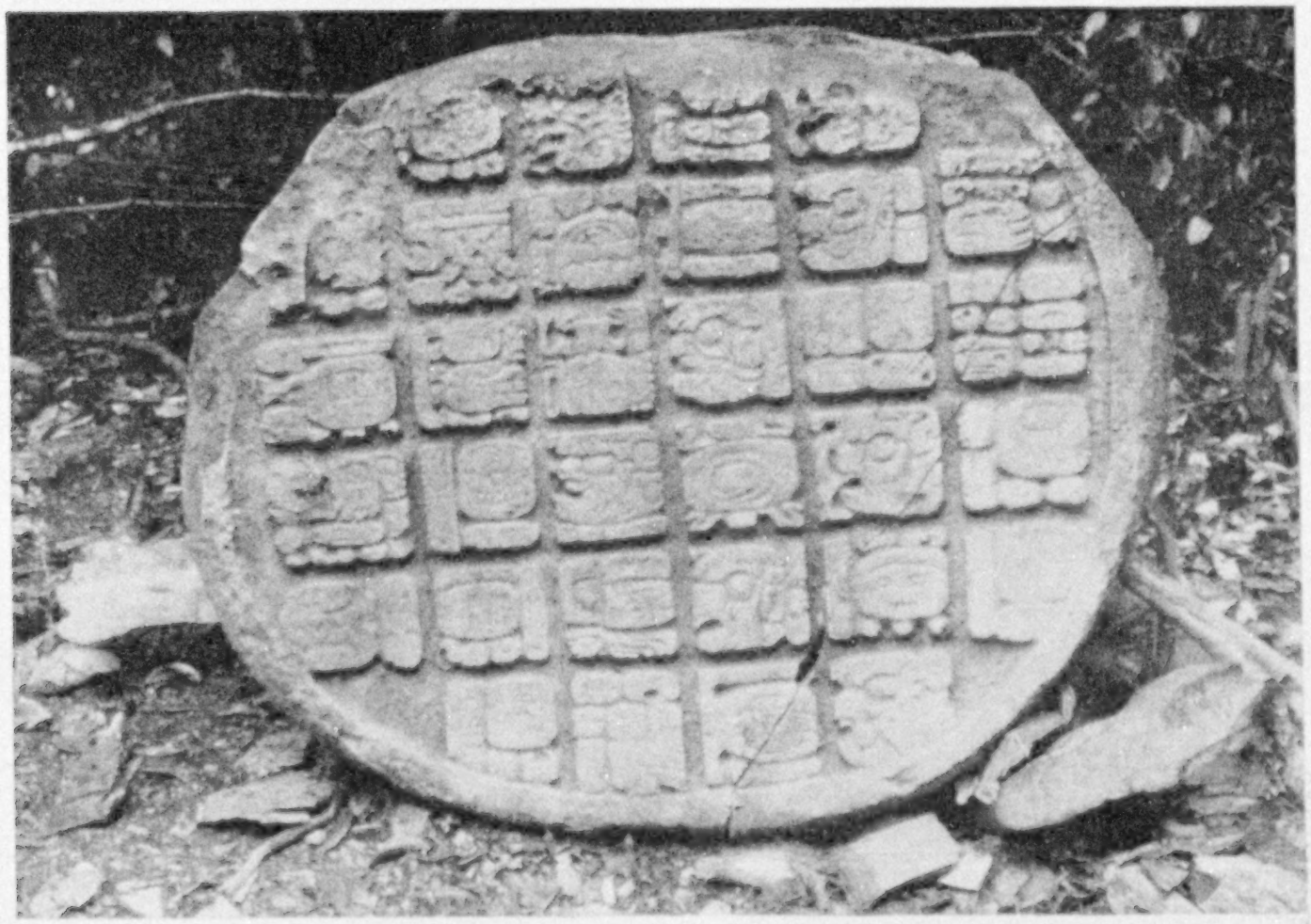
Man's first efforts at writing were doubtless as highly realistic as he could make them with his clumsy hands and still clumsier tools and drawing materials. If he wanted to express the idea "horse," he was obliged to draw the picture of a horse, since he had no symbols or characters by means of which the sound of its name could be indicated. In short, he was obliged to convey the idea of a horse to the brain by means of the eye and not the ear—realistically—that is, by its picture—instead of phonetically, by its sound.

This earliest method of expressing thoughts graphically has been called ideographic writing because its symbols express ideas instead of sounds, as do the characters of our own alphabet.

It is obvious that this kind of writing has a very limited range, being able to express little more than concrete objects, and scarcely at all to convey action, save only by the clumsy makeshift of pictures representing specific acts; and man in the course of his development eventually devised a better method of expressing his thoughts than by merely drawing pictures of them.

BIRTH OF THE ALPHABET'S FIRST ANCESTOR

At this point we reach, for the first time, the introduction of the phonetic element into writing—that is to say, where a sign or character came to represent a sound, a syllable, or a letter and ceased to be a picture of an idea. And it is precisely at this important turning point in the history of writing that the



Courtesy of The Carnegie Institution of Washington

THE ALTAR OF STELA 2, AT THE RUINS OF IXLU, PETEN, GUATEMALA

This beautiful example of Maya stone-carving, when first seen by Dr. Morley, on April 10, 1921, was tightly clasped in the roots of a large breadnut tree which was growing on top of it. When this tree was felled the next day and the altar beneath turned face upward for the first time in more than a thousand years, it was found to have six columns of hieroglyphs sculptured on its top in an almost perfect state of preservation, or 32 in all. It has been possible to decipher only the first five of these, namely, the first and second signs in the first column and the first, second, and third in the second column. These five, however, record the date of this altar as having been 10.2.10.0.0 2 Ahau 13 Chen of the Maya era (620 A. D.).

Maya graphic system stands, representing, as stated previously, a stage in the development of writing found nowhere else in the world.

This change in the character of writing symbols, from signs representing ideas to signs representing sounds, was fundamental, and its far-reaching effects cannot be overstated. It soon made possible an enormous expansion in the subjects which could be expressed by writing, and it ultimately enabled mankind to write about everything he could talk or even think about; in short, it reduced his universe to black and white—the written word.

Any graphic system, therefore, which stands at this crucial point in the evolution of writing is worthy of closer study and cannot be devoid of general interest, and in the following pages the writer has endeavored to present to the readers of the NATIONAL GEOGRAPHIC MAGAZINE a brief description of its principal characteristics.

AZTEC WRITING SIMPLER THAN THAT OF THE MAYA

However, before describing the Maya hieroglyphic writing, it will, perhaps, be easier to begin by describing the writing of the Aztec, the dominant Indian tribe of the Valley of Mexico, who had attained a high degree of civilization long before their conquest and practical annihilation by the Spaniards under Cortez, in 1521.

The Maya hieroglyphic writing was much older than that of the Aztec, and

Courtesy of the School of American Research

THE CENOTE, OR GREAT POOL OF SACRIFICE, AT CHICHEN ITZA, YUCATAN

The ceremonies begun on the lofty summit of the Castillo (see page 164) had their ending at the brink of this great natural pool or well. The spot is solemn and awe-inspiring. A great hole in the earth, 225 feet in diameter, with perpendicular or undercut sides, dropping 70 feet to the level of the black, mysterious water below, is fringed on all sides by the dense tropical forest. Here the Maya, in times of drought, formerly brought their most beautiful maidens, and from a little platform near the small shrine at the left of the picture hurled them into the depths below. If any survived the tremendous shock of this great drop and struggled to the surface of the water, ropes were let down to them and they were hauled out. more dead than alive, we may well believe. Once again on *terra firma*, they were questioned by the priests as to what they had seen below? What the gods had in store for mankind? Would the following year bring forth rain and plenty or drought and famine? For these girls were believed to have found out the answers to these questions from the rain deities at the bottom of this pool.

from the former the Aztec doubtless originally borrowed the idea of writing.

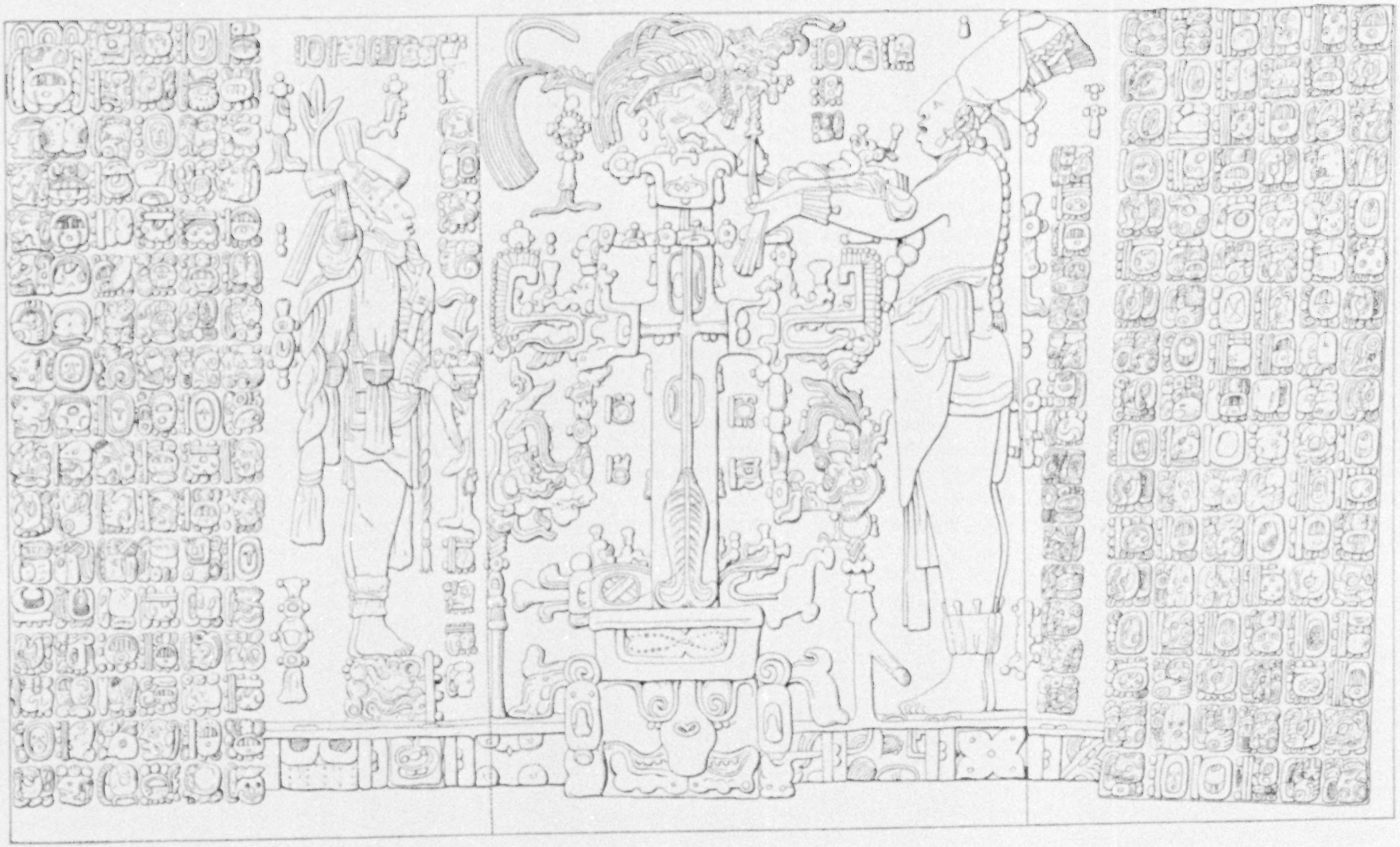
The Aztec writing is simpler than the Maya, and is better known, probably as high as 90 per cent of its signs and symbols having been deciphered. Their hieroglyphs may be divided into three groups, as follows:

1. Signs representing the calendar, such as the hieroglyphs for the days, months, and the year;

2. Signs representing the names of persons and places, such as the hieroglyphs for Montezuma and Tenochtitlan (the Aztec name for Mexico City);

3. Signs representing events or natural objects, such as the hieroglyphs for war, conquest, death, accession of rulers, festivals, eclipses, comets, earthquakes, volcanic eruptions, gold, jade, feathers, etc.

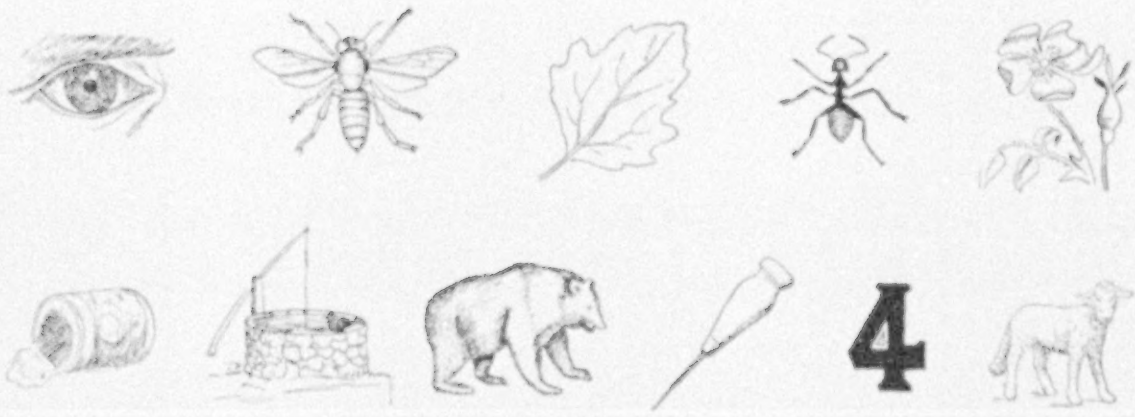
By means of these three groups of signs, painted in books made of fiber-paper or deerskin, the Aztec recorded the principal events of their history, not, to be sure, as long narratives glowing with eulogistic descriptions of the valorous deeds of kings and emperors, but as brief synopses of the principal events, none the less historically accurate, however, because of their brevity.



THE TABLET FROM THE TEMPLE OF THE CROSS AT PALENQUE, MEXICO

This magnificent specimen of ancient Maya art is engraved upon three slabs of cream-colored limestone, which originally rested against the back wall of the sanctuary in the Temple of the Cross at Palenque, Chiapas, Mexico. In 1840 the American diplomat and traveler, John Lloyd Stephens, had the left-hand panel removed to the United States, where for more than half a century it remained in the Smithsonian Institution. Many years later the right-hand panel was removed to the National Museum in Mexico City, and still later the central panel, upon which the representation of a cross flanked by two officiating priests is carved, was also taken to the same place.

After the visit of former Secretary of State Root to Mexico, the panel in the Smithsonian Institution was returned to the Government of Mexico, a graceful act of international courtesy; so that now, after the lapse of nearly three-quarters of a century, the three panels of this beautiful aboriginal sculpture are again reunited in the National Museum in Mexico City.



EXAMPLE OF REBUS-WRITING: THE AZTEC HIEROGLYPHS FOR PERSONAL AND PLACE NAMES WERE CONSTRUCTED ON THIS BASIS

The phonetic principle upon which rebus-writing is based is that of homophones—*i. e.*, words which sound alike or similar, but which have different meanings. The above rebus should be read: "I believe Aunt Rose can well bear all for you."

The Aztec calendar consisted of a year of 18 months of 20 days each, and a closing period of five days, into which it was believed all the bad luck of the year was crowded. No one started upon a journey during these five days, for fear some misfortune would befall him; no woodcutter ventured into the forest to hew wood during this period, lest wild beasts should devour him; the houses were left unswept; the housewives made no pottery vessels; children so unfortunate as to be born on one of these five days were by that very fact predestined to misfortune for the rest of their lives; it was, in fact, the "Friday the 13th" of their year.

The next, and among the Aztec the only time period higher than the year, was the *xihuitlmolpia*, or cycle of 52 years. And if they believed the closing five days of the year were fraught with ill luck, they regarded the closing night of their 52-year period with far greater terror, since it was held that at the close of one of these periods would some day come the destruction of the world.

AZTEC HIEROGLYPHS RESEMBLED REBUS-WRITING

On the last night of the xihuitlmolpia fires were extinguished on the hearths and the inhabitants of Tenochtitlan moved out of the city and took up positions on the surrounding hills, waiting feverishly either for the destruction of the world or, in the event of sunrise, the dawn of another xihuitlmolpia. Once the sun had arisen, however, great were the rejoicings. Fires were rekindled and the crisis was over for another 52 years.

The hieroglyphs for the names of persons and places, the second group mentioned previously, were built up on the basis of our own old-fashioned rebus-writing, an example of which is given on this page. This depends upon the fact that many words of different meaning have the same or similar sounds, such as: to, too, two, bear, bare, reed, read, etc. In the rebus given above the pictures actually represent: an eye, a bee, a leaf, an ant, a rose, a can, a well, a bear, an awl, the number 4, and a ewe; but they may be transcribed as: "I believe Aunt Rose can well bear all for you." It was in this manner that the hieroglyphs for Aztec personal and place names were constructed.

HOW THE AZTEC RECORDED HISTORICAL EVENTS: THE ACCESSION OF MONTEZUMA

Finally, the third group of signs represented events and natural objects, such as death, war, conquest, accession of rulers, natural phenomena, gold, jade, etc. Thus a mummy-like human figure wrapped in cloths and tied with ropes represented death. A shield with javelins crossed behind it stood for war; a burning temple for conquest, etc.

The signs of this last group were the most limited in number, but they were at the same time of the most importance, since they alone gave point and life, as it were, to the characters of the other two groups.

HISTORICAL EVENTS REPRESENTED IN THE AZTEC HIEROGLYPHIC MANUSCRIPTS

The drawing on the left shows the death of the Aztec ruler, Ahuitzotl, in the year 10 Rabbit (1502 A. D.) and the accession of his nephew, Montezuma II. The mummy of a human figure bound with ropes, with a crown on its head, indicates the death of a ruler, a mummy being the Aztec hieroglyph for death. The little water-animal attached to the crown by a cord shows that the dead ruler's name was Ahuitzotl, that being the Aztec word for "water-animal." The right half of this drawing shows a man seated upon a dais, with a crown upon his head and a speech-scroll issuing from his mouth. The Aztec word for ruler was "tlahtouani," "he who speaks," shown graphically by the speech-scroll. Finally both figures are attached by cords to the circle above, which represents the year 10 Rabbit (1502 A. D.), indicating the date of this event.

The drawings at the center and right represent the conquest of Tehuantepec in the same year by Ahuitzotl shortly before his death. The year 10 Rabbit appears at the left, next the ruler Ahuitzotl, with the three emblems of Aztec royalty: the crown, the speech-scroll, and the dais with his name-hieroglyph, "Water-animal," above him. To the right and above is a shield with javelins crossed behind it, the hieroglyph for war; below the shield is a temple in flames, the hieroglyph for conquest. To the left of the temple is the hieroglyph for Tehuantepec, the head of a cat (tecuani) and a hill (tepec). The whole record might be paraphrased thus: In the year 10 Rabbit the ruler Ahuitzotl fought and conquered the town of Tehuantepec.

Several examples of the Aztec hieroglyphic writing are given on pages 117, 118, and 119. The picture at the left on this page represents the death of the Aztec ruler Ahuitzotl in 1502 A. D. and the accession of his nephew, Montezuma II, to the rulership of the tribe. At the top we see a circle, within which are a rabbit's head and 10 dots. This stands for the year 10 Tochtli or 10 Rabbit, corresponding to the year 1502 of the Christian era.

The Aztec had four different kinds of years: Reed, Flint, House, and Rabbit, named after the days (Reed, Flint, House, and Rabbit) with which they successively began. The numbers attached to these names, 1 to 13 inclusive, do not follow the sequence of our own numbers, so that the year 1 Flint follows the year 13 Reed.

Attached to the year 10 Rabbit, on the left, by a cord, there is the figure of a mummy bound with ropes and surmounted by a crown. This indicates the death of some ruler.

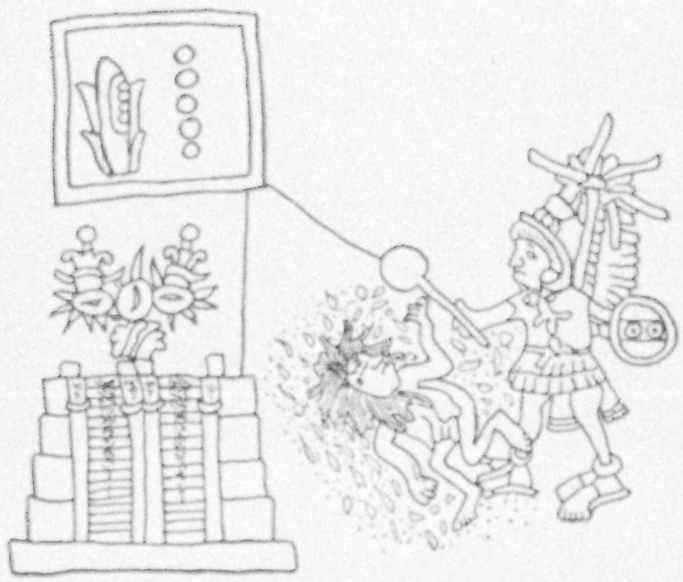
Another cord runs from the crown of this mummy to a small animal, from whose feet hang water symbols. This is the hieroglyph for Ahuitzotl, the Aztec word for water-animal. This much of our picture, then, records the death of the ruler Ahuitzotl in the year 10 Rabbit—*i. e.*, 1502 A. D.

To the right of this mummy there is a living figure, also attached to the circle above by a cord and also wearing the same crown. This right-hand figure is seated upon a dais, another emblem of Aztec royalty, and from its mouth there issues a scroll, the Aztec sign for supreme authority. The Aztec word for ruler was "tlahtouani," which means "he who speaks," shown graphically by a speech-scroll issuing from the mouth.

Finally, attached to the crown of the second figure is another crown, which is the hieroglyph for the name Montezuma, and the right-hand part of the picture is to be read: Montezuma became ruler in 1502.

THE RECORD OF A CONQUEST

Elliptical and abbreviated as this record is, it sets forth clearly that the ruler Ahuitzotl died in 1502 and was succeeded by Montezuma.



DEDICATION OF THE GREAT TEMPLE OF HUITZILIPOCHTLI, THE AZTEC GOD OF WAR, AT TENOCHTITLAN, IN THE YEAR 5 FLINT (1484 A. D.)

The year 5 Flint is represented in the square above by the flint with the five dots on its right. Below is the great temple of the War God, its stairway red with the blood of the sacrificial victims. On top of the pyramid is the hieroglyph for Tenochtitlan, the ancient name of Mexico City, expressed by a stone with a cactus growing out of it. On the right is a priest in the act of despatching one of the human victims. This event took place in the second year of the reign of Tizoc, the seventh Aztec ruler, and it is said to have been the first occasion when human sacrifice was practiced by the Aztec, previously to this the sacrifices having been of animals and birds.

The second and third figures on page 117 represent the conquest of the town of Tehuantepec by the Aztec ruler Ahuitzotl shortly before his death, in 1502. In the square at the left hand is the year 10 Rabbit, which corresponded, as explained previously, to the year 1502. Next Ahuitzotl is portrayed with the three emblems of Aztec royalty—the crown, the dais, and the speech-scroll. His name glyph, "The Water-animal," appears above, attached to his head by a cord.

The shield with the javelins behind it is the Aztec hieroglyph for war (at the right, above), and the temple in flames (at the right, below, note the smoke curls) denotes conquest.

The name of the town conquered appears to the left of the burning temple; it is the head of a man-eating cat, possibly the jaguar, surmounting a hill: *tecuani,* a "man-eating cat," and *tepec,* "hill or town." This picture, therefore, is to be interpreted as recording the conquest of the town of Tehuantepec, in southern Mexico, on the isthmus of the same name, by the ruler Ahuitzotl in 1502.

THE RECORD OF A TEMPLE'S DEDICATION

The picture on this page portrays the dedication of the great temple of Huitzilipochtli, the Aztec God of War, at Tenochtitlan, in 1484, at which human sacrifice is said to have been practiced for the first time. In the square above is a piece of flint and five dots, representing the year 5 Tecpatl, or 5 Flint, corresponding to 1484 A. D. To this is attached, on the right, the figure of a priest who has just sacrificed a human victim, the latter pictured as dying on the ground, weltering in his own blood.

To the left is the great temple of the War God, the stairway being shown as plentifully besprinkled with the gore of the hecatomb of victims. On top of the pyramid is a stone from which grows a cactus, this combination being the hieroglyph for Tenochtitlan.

HOW THE AZTEC RECORDED AN ECLIPSE

Figure *a* on page 119 shows an eclipse of the sun which was visible in the Valley of Mexico in 1510. Again the year is shown by the rabbit's head and the five dots in the square above—*i. e.,* 5 Tochtli, or 5 Rabbit (1510), from which hangs the sun's disk with a sector bitten out of it, the Aztec hieroglyph denoting an eclipse.

Figure *b* on page 119 represents a comet which swept over Mexico in 1489. Above, the year 10 Calli, or 10 House, is recorded, which corresponded with the year 1489 of the Christian era. Attached to the year is the hieroglyph for a comet, happily represented by the Aztec as a large serpent stretching across the heavens.

Montezuma regarded this comet as an evil omen, presaging the downfall of himself and his race; so that three decades later, when Cortez landed in Mexico, the superstitious Indian ruler thought that the fair-skinned Spaniards were sons of the white-skinned, golden-haired Aztec god, Quetzalcoatl, and pursued such a vacillatory policy toward the invaders

that his empire was speedily destroyed and his people enslaved forever.

AN EARTHQUAKE ACCOMPANIED BY A VOLCANIC ERUPTION

The third figure, *c*, on this page, shows an earthquake accompanied by a volcanic eruption, which occurred in the Valley of Mexico in 1533. Above we see the year 2 Calli, or 2 House, corresponding to 1533 A. D. Below is a star, above which smoke scrolls are rising. The Aztec word for a volcanic eruption is smoke ascending to the stars, and this is the sign for it. At the bottom is a sign which means "movement" (ollin), applied to a speckled band which represents the earth, and a "movement of the earth" is very emphatically an earthquake.

Figure *d* on this page represents a heavy fall of snow which occurred in the town of Tlachquiahco in 1503.

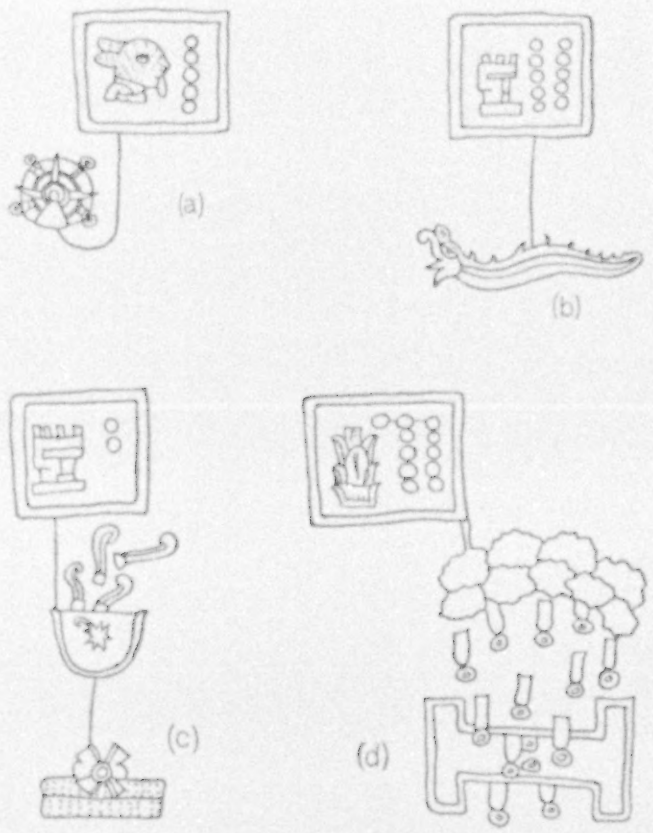
Above is the year 11 Acatl, or 11 Reed (1503), to which is attached a great bank of clouds, the snow. Below is an H-shaped object, the Aztec ball-court, *tlachtli*, covered with water symbols, *quiahuitl*, the rain; the combination of the two giving *tlach* (tli) *quiah* (uitl), the parts in parentheses being omitted in combination and the *co* being added as indicating a place: Tlachquiahco.

It was by means of such simple symbols as these, and all told there were not so many of them, that the Aztec were able to set forth the principal events of their history, to record and date the accessions and deaths of their rulers, their wars and conquests, and the tributes exacted from the conquered cities and towns of Anahuac (the ancient name for central Mexico).

They noted important religious ceremonials and extraordinary natural phenomena—earthquakes, volcanic eruptions, comets, and the like—and, finally, famines, pestilences, and migrations.

MAYA WRITING FAR MORE COMPLEX

In short, the Aztec hieroglyphic writing, of which we now read about 90 per cent of the characters, gives only a skeleton of history, the barest outline of principal events; but as for detailed descriptions, extended narratives, there are none—in fact, such were quite beyond



NATURAL PHENOMENA RECORDED IN THE AZTEC HIEROGLYPHIC MANUSCRIPTS

(*a*) An eclipse of the sun which took place in the year 5 Rabbit (1510 A. D.). The year is represented by the rabbit's head and the five dots in the square above, and the eclipse of the sun by the picture of the sun's disk with a sector bitten out of it.

(*b*) A comet which swept over the Valley of Mexico in the year 10 House (1489 A. D.). The year is represented in the square above and the comet by the serpent below.

(*c*) A volcanic eruption and earthquake in the year 2 House (1533 A. D.). The year appears in the square above. Below is a star with smoke curls rising above it, the sign for a volcanic eruption, the Aztec word for which is "smoke ascending to the stars." Below is the sign for an earthquake, a sort of winged eye, meaning "movement" (Aztec ollin), applied to the earth, the speckled rectangle.

(*d*) A heavy fall of snow which occurred in the province of Tlachquiahco in the year 11 Reed (1503 A. D.). The year appears above. The bank of clouds indicates the snow, and the H-shaped object below, covered with water symbols, is the hieroglyph for the province of Tlachquiahco.

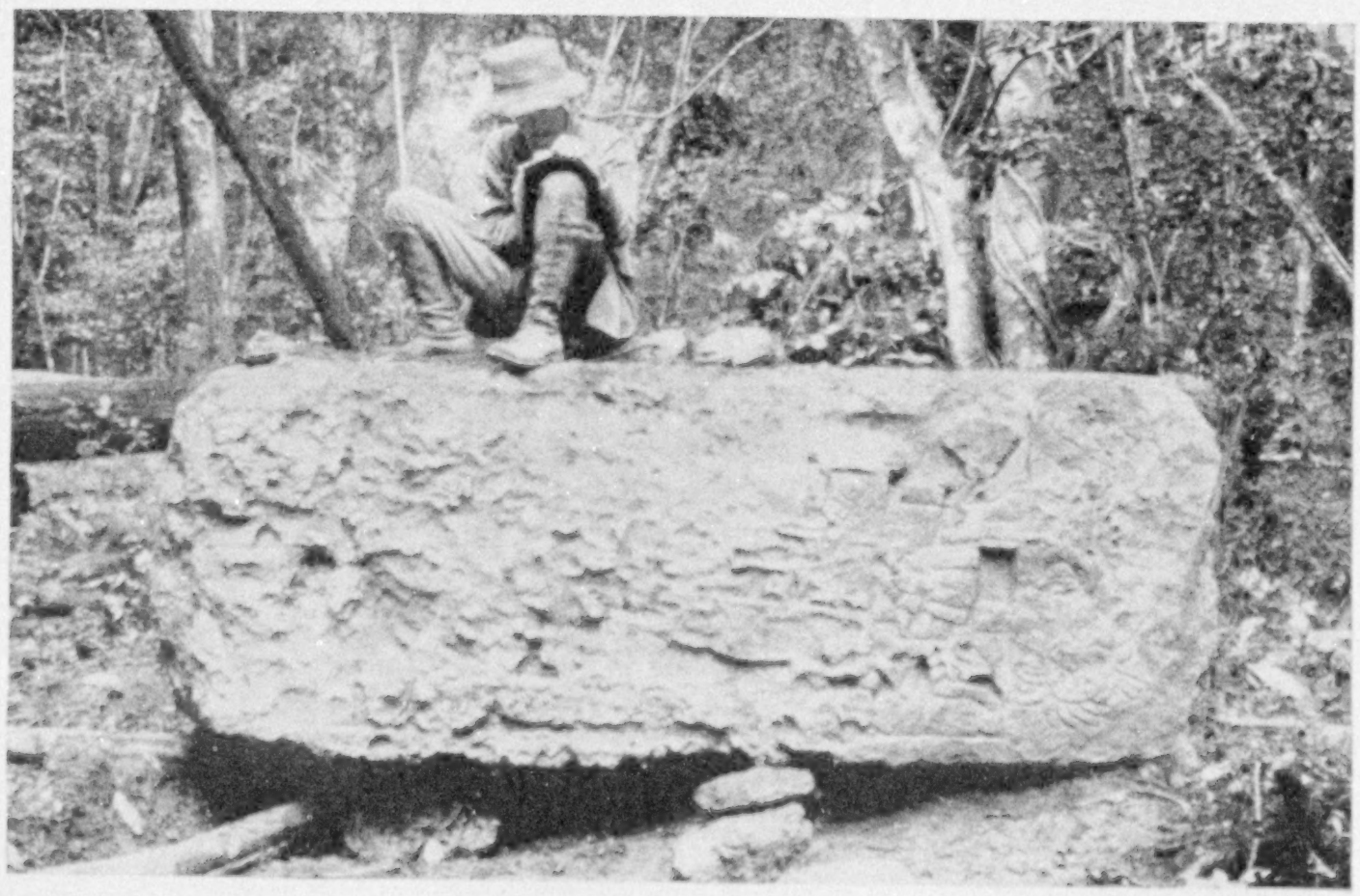
the compass of its limited and simple symbols to express.

The Maya hieroglyphic writing presents greater problems in decipherment. To begin with, its characters are much more numerous, probably twice as many as in the Aztec writing, and at the same time they are much more complex.

Again, the Spanish priests and chroniclers of the 16th century have described

LUNCH AT THE RUINS OF NARANJO, PETEN, GUATEMALA

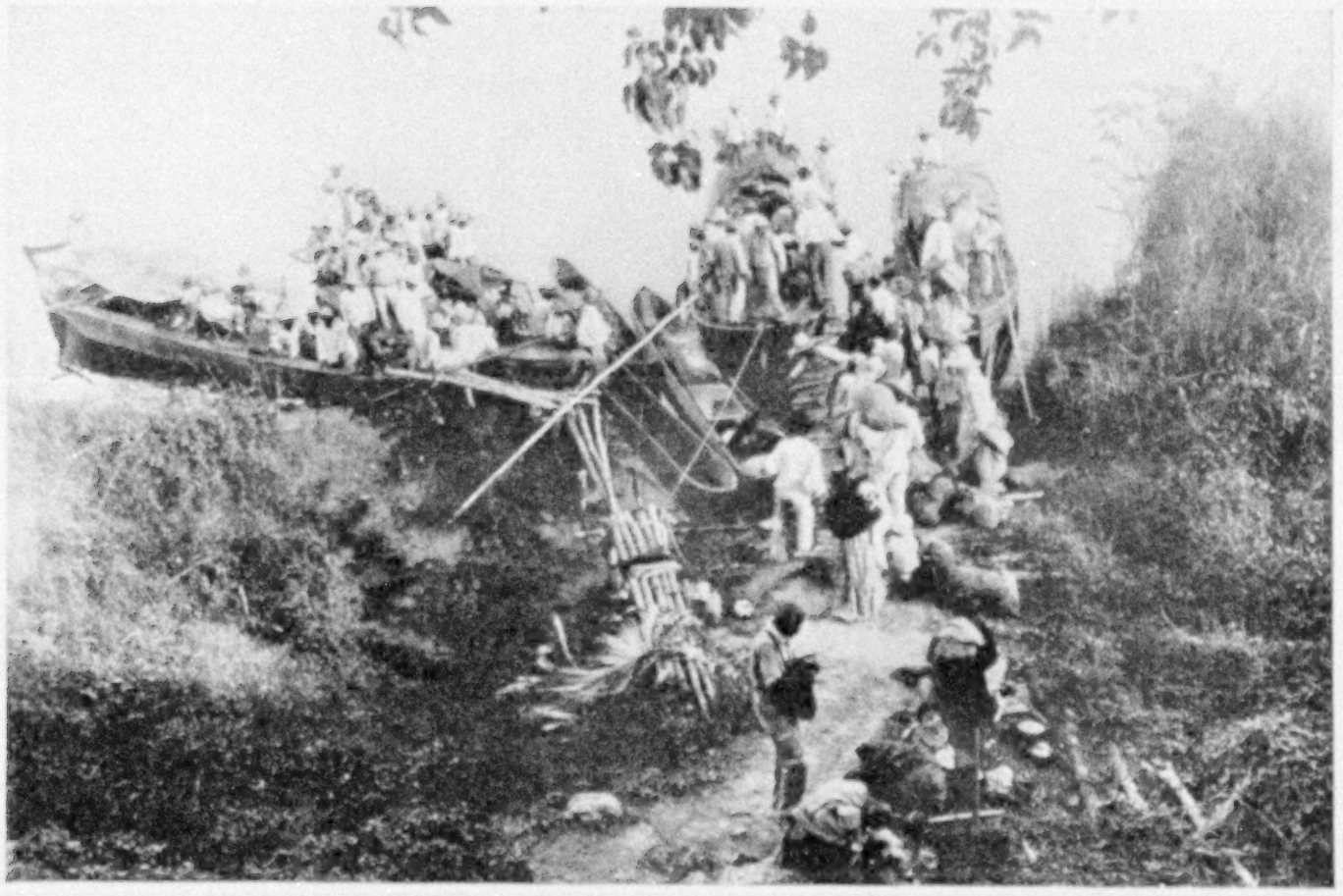
After a hot morning's work stumbling through the dense bush in search of new monuments, lunch taken on top of one of them is very grateful.



Courtesy of The Carnegie Institution of Washington

DRAWING A HIEROGLYPHIC INSCRIPTION ON A NEWLY TURNED MONUMENT IN PETEN

The figure on the monument is not posing for his picture, but was caught unaware by the expedition photographer while engaged in the intricacies of deciphering a newly found hieroglyphic inscription.



Courtesy of The Carnegie Institution of Washington

CHICLE HUNTERS RETURNING HOME AT THE END OF THE CHICLE SEASON EARLY IN THE SPRING

The milk of the chico-sapote tree, from which chewing-gum is made, runs only during the rainy season, from June to January, inclusive, during which time the chicle-bleeders are in the bush. At the end of the season they return to their homes for three or four months, to spend in a fortnight all they have so laboriously earned during the past seven or eight months, and then to live on credit until the beginning of the next season. This picture shows a group of 150 chicle-bleeders being picked up at a camp on the San Pedro Martir River, in Peten, to be carried down stream to their various villages. They travel with all conceivable impedimenta, from an umbrella to a pet monkey, and are of both sexes and all ages.

at considerable length the Aztec graphic system, whereas only one authority, Bishop Diego de Landa, has written anything detailed about the Maya writing. And, finally, although nearly two score Aztec hieroglyphic manuscripts or books have come down to us, only three Maya ones have been found: The Dresden Codex, at the Royal Library at Dresden; the Tro-Cortesianus Codex, at the Royal Academy of History, Madrid, and the Peresianus Codex, at the Biblioteque National, Paris.

These several factors have made the problems involved in its complete decipherment more difficult than that of the Aztec, and have left us more in the dark as to the subjects covered in the Maya inscriptions.

The Maya hieroglyphic writing is composed of about 400 different characters or elements, of which probably as high as 90 to 95 per cent are ideographic rather than phonetic, as has been explained.

These four hundred odd basic elements, however, are combined in about half as many common compound characters, about half of which in turn have been deciphered; so that it may be fairly claimed that the Maya inscriptions no longer are a sealed book to us. Although much remains to be done in this important line of investigation, already enough characters have had their meanings determined so that we begin to catch the general drift of these records, even if the details still escape us.

MARVELOUS ACCURACY SHOWN IN MAYA CALENDAR

So far as the Maya inscriptions have been deciphered, they deal exclusively

Photograph from the Biologia Centrali-Americana

REPRESENTATION OF A BLOOD-LETTING CEREMONY

This sculptured panel, now in the British Museum, was originally carved on the under side of a door lintel in one of the temples of the great Maya city of Yaxchilan, in southern Mexico. A priest with a ceremonial staff is shown at the left, supervising a blood-letting ceremony, possibly by a neophyte, who is kneeling at the right. Note the gorgeous details of the priest's costume. The neophyte, scarcely less handsomely garbed, is engaged in drawing blood from himself by passing through a slit in his tongue a long piece of rope with sharp thorns fastened to it. A basin on the ground catches the drops of blood as they fall.

Courtesy of The Carnegie Institution of Washington

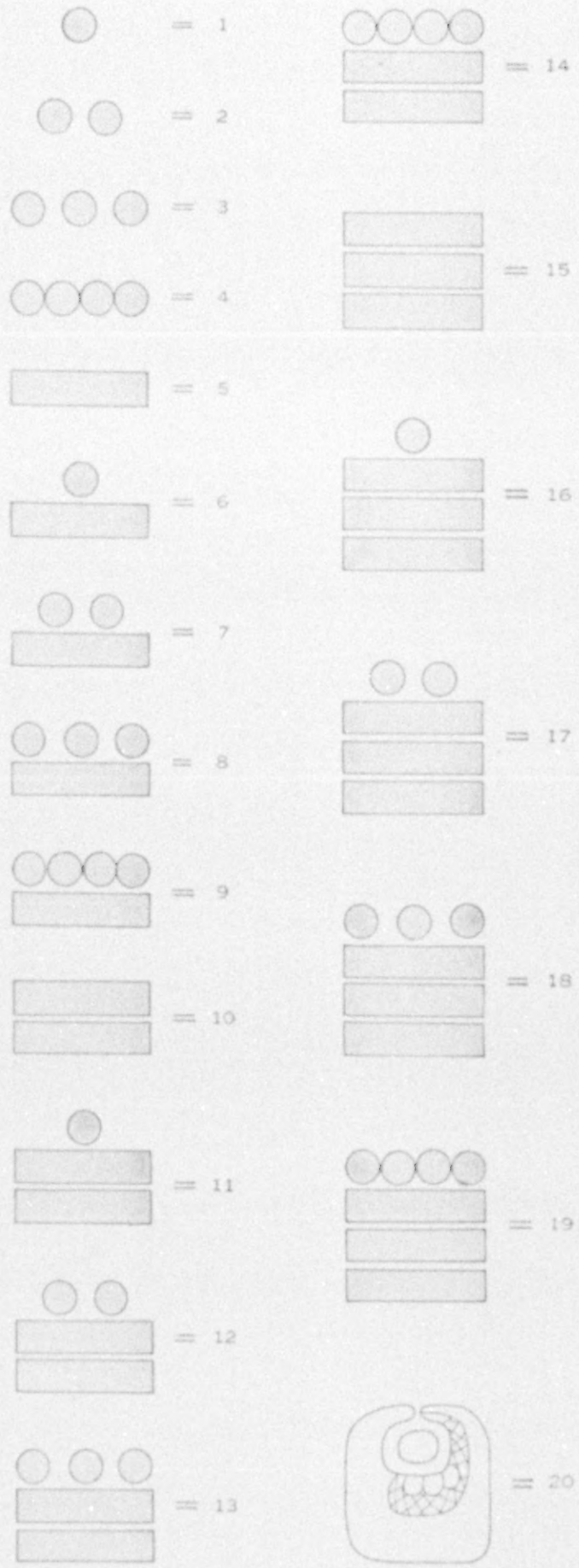
ALTAR 2, AT THE RUINS OF CANCUEN, GUATEMALA

This altar was discovered in 1915, at the ruins of Cancuen, on the east bank of the Pasión River, in southern central Peten. It is 2 feet in diameter and 7 inches in thickness and the sculpture on the top represents two priests officiating at an altar (the disk between them). The first two hieroglyphs at the top give its date as 9.18.5.0.0 4 Ahau 13 Ceh of the Maya era (536 A. D.).

with the counting of time in one phase or another. They record with extraordinary accuracy the dates of the monuments upon which they are engraved, so that no confusion exists between any two days within a period of more than 370,000 years.

They set forth elaborate lunar or moon calendars, in which the lunar month, involving a very difficult fractional number, is delicately and exactly coördinated with the solar calendar over long periods of time. They predict eclipses and correctly record the movements and phases of the planets, especially Venus; and, in addition to the foregoing, there is a wealth of other chronological data of as yet unknown significance.

Whether this last refers to historical events or astronomical phenomena has



THE MAYA "ROMAN NUMERALS"

In the Maya bar and dot numerals, the dot stands for 1 and the bar for 5. These elements, when added together in the proper combinations, give the numbers from 6 to 19, inclusive. The number 20 is shown at the bottom of the second column. It is also the hieroglyph for the moon.

not yet been determined, though doubtless the still undeciphered hieroglyphs will clear up this point when their meanings shall have been worked out.

It is evident from the foregoing that the element of time was of primary importance to the ancient Maya, and that its record, as variously manifested by the sun, moon, and planets, fills a large part of their inscriptions.

MAYA ARITHMETIC

Let us next examine, then, some of the features of Maya arithmetic and see how these chronological and astronomical facts were expressed.

First, the Maya, like ourselves, had two different ways of writing their numbers, one by bars and dots, and the other by different types of the human head. The former may be likened to our Roman numerals, and the latter to our Arabic numerals.

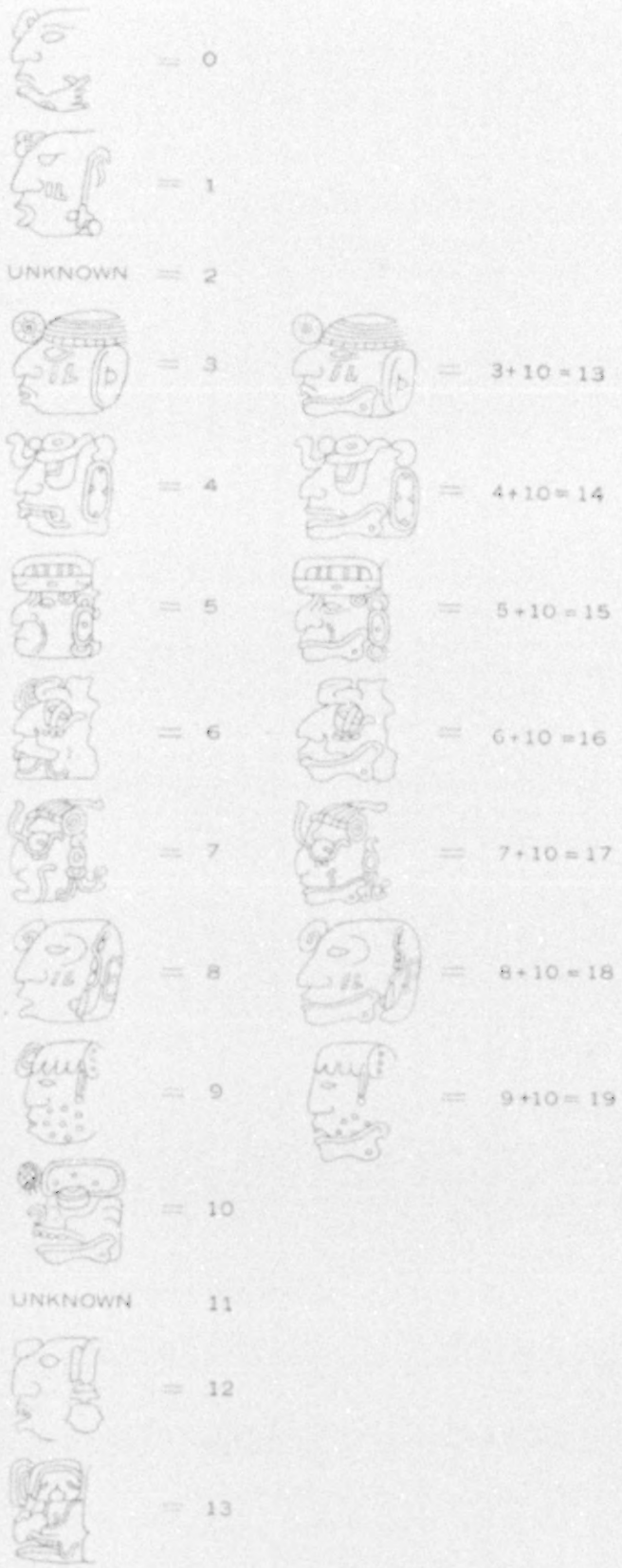
The Maya "Roman notation" made use of but two elements, the dot standing for the number 1 and the bar standing for the number 5. In this respect, at least, their bar and dot numerals were even simpler than our Roman numbers, since we have to use seven letters—I, V, X, L, C, D, and M—in the Roman notation. By various combinations of these two elements, in which the dot had the value of 1 and the bar of 5, the Maya wrote the numbers from 1 to 19, inclusive (see the examples of bar and dot numerals on this page).

The Maya "Arabic notation" made use of 13 different types of human heads to express the numbers 1 to 13, inclusive; and then, by applying the essential characteristic of the head for 10, a fleshless lower jaw to the heads for 4, 5, 6, 7, 8, and 9, they formed the numbers 14, 15, 16, 17, 18, and 19, respectively (see the examples of head numerals on the opposite page).

One peculiar feature of this notation was the use of two kinds of heads for the number 13—the simple form shown at the bottom of the first column on page 125, and the compound form, 3 + 10, shown at the top of the second column. The use of the latter, however, was very rare, there not being more than two or three examples of it known.

The higher numbers were expressed

by positions from bottom to top in a column. Just as in our decimal system the positions increase by a ratio of 10 from left or right of the decimal point, viz., units, tens, hundreds, thousands, etc., so the Maya positions increased by a ratio of 20 from bottom to top in a column, in all places except the third, which, instead of being 400, *i. e.*, 1 x 20 x 20, was 360, *i. e.*, 1 x 20 x 18. This single break in an otherwise perfect vigesimal system of numeration was doubtless due to the desire to bring its third term as near to the length of the solar year as possible, 360 being much nearer to 365¼ than 400. Examples of higher numbers are given on page 126.



THE MAYA "ARABIC NUMERALS"

In the Maya head numerals there are 14 different types of human heads, representing the numbers from 0 to 13, inclusive, although the heads for two of these numbers, 2 and 11, have not yet been deciphered. The numerals from 13 to 19, inclusive, were formed by adding the essential characteristic of the head for 10—*i. e.*, the fleshless lower jaw—to the heads for 3 to 9, inclusive. Thus, for example, adding the fleshless lower jaw of the head for 10 to the head for 6, characterized by the "crossed bands" in the eye, gives the head for 16, viz., $10 + 6 = 16$.

LITTLE OR NO HISTORICAL MATTER IN MAYA WRITINGS

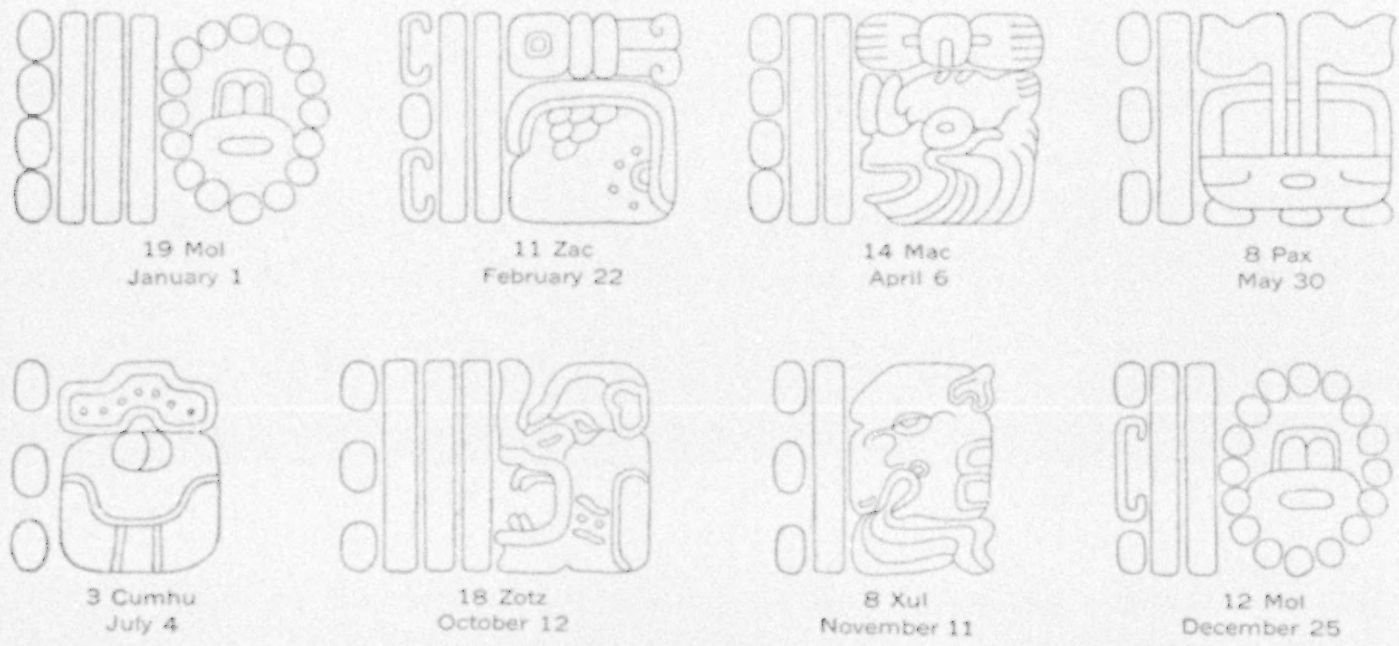
It was stated that in so far as they have been deciphered, and it is now possible to read nearly one-half of the Maya hieroglyphs, the Maya inscriptions have been found to deal exclusively with the counting of time in one way or another.

No grandiloquent record of earthly glory these. No bombastic chronicles of kingly pomp and pageantry, like most of the Assyrian, Babylonian, and Egyptian inscriptions. On the contrary, the Maya priests would seem to have been concerned with more substantial matters, such as the observation and record of astronomical phenomena. Of first importance to them would appear to have been the dates of the many monuments they erected.

These dates are usually recorded at the beginnings of the inscriptions, and are frequently of such accuracy as to fix their positions within a period of some 370,000 years, surely not an inconsiderable achievement for any time-count, even one of modern origin.

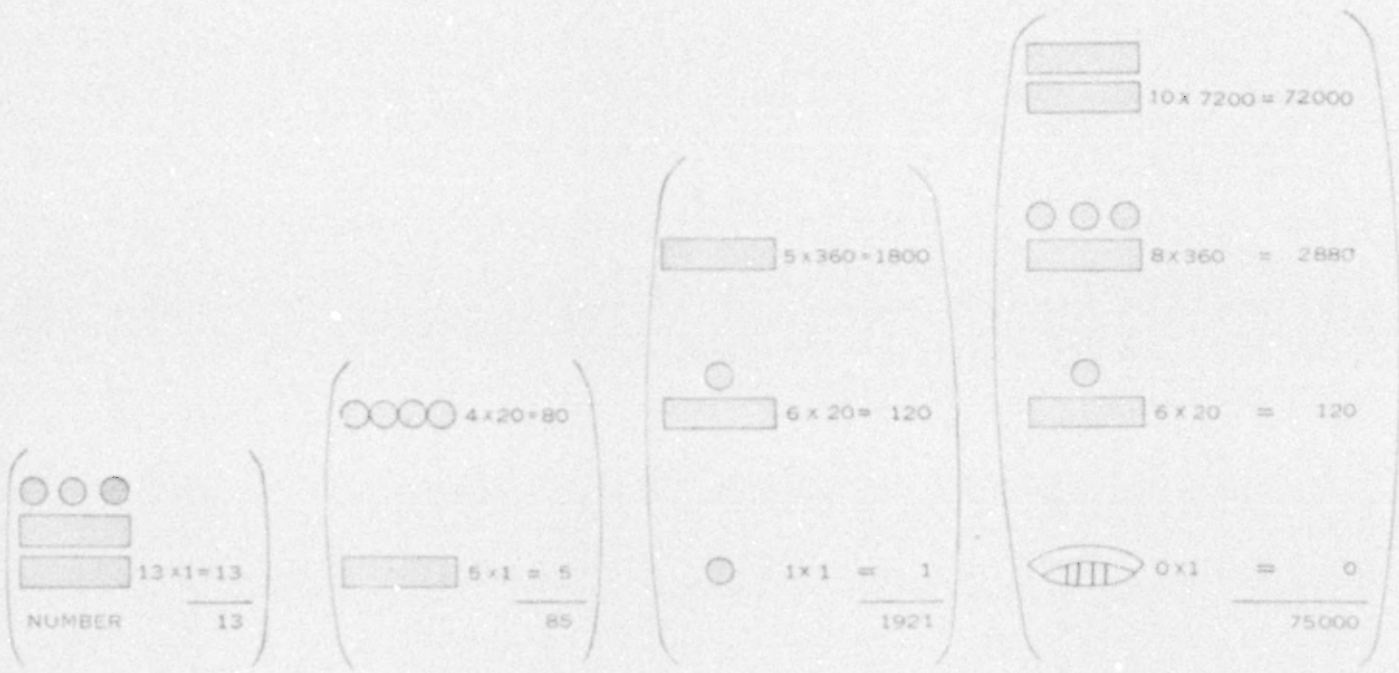
THE MAYA ERECTED THEIR MONUMENTS AT INTERVALS OF EVERY 1,800 DAYS

The Maya monuments, it has been ascertained from their dates, were erected at intervals of every 1,800 days—nearly five years. This custom seems to have been so general that on several occasions, when monuments commemorating specific 5-year periods at certain cities were missing, it has been



THE MAYA EQUIVALENTS FOR OUR PRINCIPAL HOLIDAYS

Every day of the Maya year had its corresponding hieroglyph. In 1566, when Bishop Landa wrote his famous "History of the Things of Yucatan," the Maya year began on July 16 (Old Style) or July 26 (New Style). On the basis of this correlation the Mayan equivalents for some of our principal holidays are given above, the numbers in bars and dots at the left indicating the positions in the months, and the signs to the right the names of the corresponding Maya months.



THE HIGHER MAYA NUMBERS

Our own arithmetical system is decimal, the values of the terms increasing from left or right of the decimal point in a ratio of 10. The Maya arithmetical system was vigesimal—that is, the values of the terms increased from bottom to top in a ratio of 20, except in the case of the third term, which was 360 (*i. e.*, $1 \times 20 \times 18$) instead of 400 (*i. e.*, $1 \times 20 \times 20$). This break in an otherwise perfect vigesimal system was probably due to the desire to bring its third term as near to the length of the solar year as possible.

The first number above is 13, *i. e.*, 13 units of the first order, or 13×1. The second number is 85, which the Maya wrote as 5 units of the first order, or 5, and 4 units of the second order, or $4 \times 1 \times 20 = 80$; and $5 + 80 = 85$. The third number is 1,921, *i. e.*, 1 unit of the first order, 6 units of the second order ($6 \times 1 \times 20 = 120$), and 5 units of the third order ($5 \times 1 \times 20 \times 18 = 1{,}800$); all of which, added together, give $1 + 120 + 1{,}800 = 1{,}921$. The fourth number is 75,000, *i. e.*, 0 units of the first order, 6 units of the second order ($6 \times 1 \times 20 = 120$), 8 units of the third order ($8 \times 1 \times 20 \times 18 = 2{,}880$), and 10 units of the fourth order ($10 \times 1 \times 20 \times 18 \times 20 = 72{,}000$); all of which, added together, give $0 + 120 + 2{,}880 + 72{,}000 = 75{,}000$. By this method the Maya could write numbers as high as 64,000,000.

possible, first to predict their existence and later to have found them. Indeed, these intricately carved monoliths are probably to be regarded as little more than 5-year almanacs in stone, which set forth not only the dates of their erection or dedication, but also important lunar and planetary phenomena as well.

THE PRINCIPAL GODS OF THE ANCIENT MAYA

There were not less than twelve major deities in the Maya Pantheon. The four most important are represented here with their name hieroglyphs below them. From left to right they are: Itzamna, the Mayan Jupiter and the Father of Mankind; Kukulcan, the Feathered Serpent, Culture Hero of the Itza nation; Ahpuch, the Lord of Death (note the fleshless lower jaw used in the head numbers for 10, 14, 15, 16, 17, 18, and 19); and Yum Kax, Lord of the Harvest, his head-dress representing a conventionalized ear of corn

An example of this kind occurred at the ruins of Piedras Negras last May. After the Carnegie Expedition had been at this site a week, it was found that there was a corresponding monument for every 5-year period from 378 to 536 A. D., save only for the 5-year period ending in 487 A. D.

The writer, on the basis of this condition, predicted that a monument would surely be found bearing this date; and on May 22 Mr. O. G. Ricketson, Jr., who was mapping the city, discovered the beautiful stela shown on page 129, which the inscription on its side shows was erected in 9. 15. 15. 0. 0 9 Ahau 18 Xul (487 A. D.), thus making the series of period-markers at this city complete for 158 years.

This new monument, which was named Stela 40, is 16 feet high, 4 feet wide, and 1½ feet in thickness. It represents Yum Kax, Lord of the Harvests, sowing corn. The God is seen dropping grains of corn from his extended right hand, the left holding the bag from which he has taken them. His head-dress, in keeping with his character of the Corn God, is a conventionalized ear of corn. Below there is a large human head and shoulders upon which the corn is falling. Could this have been a Maya conception of the Earth Mother receiving the seed she is to fructify?

OTHER MAYA HIEROGLYPHS

Top row, certain colors; middle row, certain heavenly bodies; bottom row, the cardinal points.

"THE HOTUN," A GREAT NATIONAL HOLIDAY

This prediction of the existence of monuments in advance of their actual discovery has been repeated elsewhere, notably at Quirigua and Naranjo, where the sequence of the 5-year period-markers was at first incomplete, as in the case of Piedras Negras, subsequent discoveries, however, having filled in the gaps. Indeed, the writer regards the discovery of the principle which governed the erection of the Maya monuments, namely the 5-year interval, as one of the most important contributions to the subject during the past decade.

A name has been invented for this period, "hotun," the Maya word for "5 tuns" or 5 of their 360-day periods, and its hieroglyph has been identified.

The prevalence of this practice of erecting period-markers throughout the Old

Courtesy of the Peabody Museum of Harvard University

FOUR MAYA MONUMENTS OF DIFFERENT AGES, SHOWING THE DEVELOPMENT OF STONE-CARVING DURING THE OLD MAYA EMPIRE

The first monument (Stela 3, at Tical) dates from 229 A. D.; the second (Stela 25, at Naranjo) is 125 years later, dating from 354 A. D.; the third (Stela B, at Copan) is 118 years later than the second, dating from 472 A. D.; the fourth (Stela 10, at Seibal) is 118 years later than the third and dates from 590 A. D.

Empire and its persistence down to the time of the Spanish Conquest, in 1541, calls up an interesting picture. We may imagine the closing day of these 5-year periods as great religious festivals. The inhabitants from the surrounding countryside gathered in the nearest city to attend the dedication of the monument, which had been prepared so laboriously and painstakingly under the supervision of the priests during the previous five years.

They could not read the hieroglyphic writing, it is true, but during the dedication ceremonies the priests doubtless informed them of the various astronomical phenomena of which they treated. With prayers to the gods for rain and fertility, with sacrifices and probably religious dances, the current period-marker was formally dedicated, perhaps we may even say "unveiled."

A parallel case would be as if on the 31st of December every fifth year, say in 1915, in 1920, in 1925, the inhabitants of our larger cities should congregate in the principal squares or plazas of their respective centers, and under their city authorities and clergy formally dedicate monuments commemorating the principal events of the past 5 years, this same ceremony being held all over the country on the same day. It was in fact a great national festival, possibly indeed the greatest national holiday of the ancient Maya.

When it is remembered that all the beautiful carvings found on these period-markers were made with tools of stone only, since the Maya of that time had no metals, the magnitude of their achievement grows and we are lost in wonder at the ingenuity and brilliance of this great native American people.

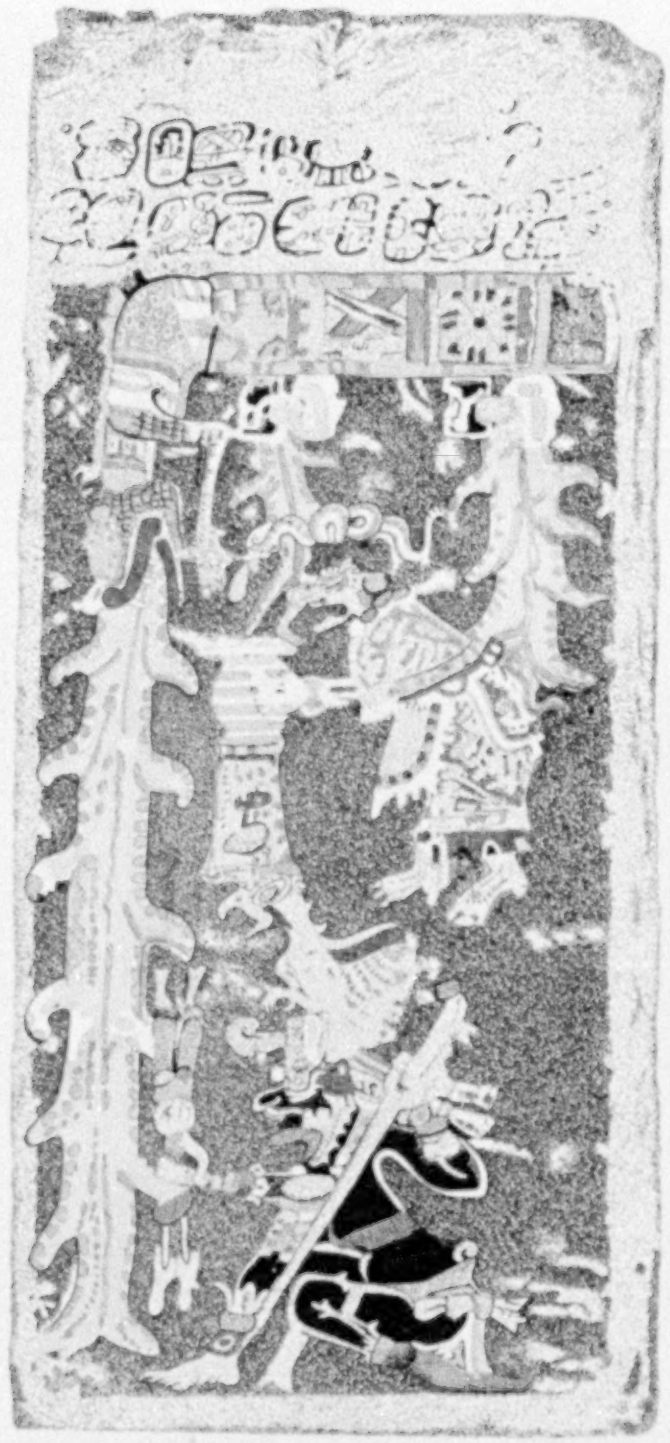
THE MAYA INSCRIPTIONS PRINCIPALLY ASTRONOMICAL AND CHRONOLOGICAL

It is becoming increasingly apparent, as we press our way into the meaning of the still undeciphered hieroglyphs, that they deal more and more with the subject-matter of astronomy and less and less with that of history. So much so, in fact, that if historical data be present at all on the Maya monuments, they must be confined to brief allusions to the more important events, as in the case of the Aztec manuscripts already described.

Courtesy of The Carnegie Institution of Washington

THE CORN GOD SOWING GRAINS OF THE MAYA STAFF OF LIFE

This is one of the finest examples of Maya stone-carving that has come down to us. It was discovered May 22, 1921, at the city of Piedras Negras, Guatemala (see text, page 127).



DESTRUCTION OF THE WORLD BY FLOOD AS REPRESENTED IN A MAYA HIEROGLYPHIC MANUSCRIPT

The above illustration shows the destruction of the world by water as depicted in the Dresden Codex (see page 121).

Across the sky stretches a great serpent belching forth torrents of water. From his body hang the sun and moon, both shown as in eclipse (note the black and white wings on each side of them), streams of water also pouring down from them.

Below the serpent is the old Tiger-clawed Goddess with a snake head-dress. On her skirt is broidered a pair of cross-bones—our own modern symbol for death. She holds a water-jar upside down, from which gushes another torrent of water.

Finally, below is the Black Captain, the Maya God of War, the Moan, a bird of ill omen, perched upon his head, down-pointing arrows and a javelin in his hands.

And it must be remembered in this connection that no Maya signs of abstract general meaning, like those in group 3 of the Aztec signs, have as yet been deciphered, and only a very few of group 2, namely, the signs for the names of the principal deities (see page 127).

If, therefore, as now seems probable, we must abandon the idea that the ancient Maya recorded history in their inscriptions, save only in very abbreviated and synoptical allusions to the more important events, we may, on the other hand, console ourselves with the reflection that possibly they were more worthily employed in recording matters of scientific moment, such as the movements of the heavenly bodies.

So accurate, indeed, would appear to have been their observations in this particular field that before long we shall probably know the ages of the different Maya cities more exactly than we will ever know the ages of Babylon, Nineveh, Memphis, Thebes, Athens, or even of Imperial Rome herself.

MAYA CHRONOLOGY, THE TIME "YARDSTICK" FOR ALL ASSOCIATED CULTURES

Finally, this greatest aboriginal American writing provides us with a system of counting time, a chronological yardstick, as it were, by means of which it will eventually be possible to date all the contiguous ancient American civilizations as far south as the great cultures of Peru, the Inca,* etc., and as far north as the Pueblo culture of our own Southwest.

Indeed, the writer regards it as not only possible, but even probable, that the comprehensive excavations now being undertaken by the National Geographic Society at Pueblo Bonito, Chaco Cañon, New Mexico, may at any time bring to light specimens, pieces of pottery brought in by trade in ancient times from central Mexico, which in turn will be datable in the Maya chronological system, and hence in our own Christian era.

* See in the NATIONAL GEOGRAPHIC MAGAZINE "Explorations in Peru," April, 1912; "In the Wonderland of Peru," by Col. Hiram Bingham, April, 1913; "The Story of Macchu Picbu," by Col. Hiram Bingham, February, 1915; "Further Explorations in the Land of the Incas," by Col. Hiram Bingham, and "Staircase Farms of the Ancients," by O. F. Cook, May, 1916.

THE JUNGLES OF PANAMA

By David Fairchild

Agricultural Explorer in Charge of Foreign Seed and Plant Introduction, Department of Agriculture, Author of "Forming New Fashions in Foods," "A Hunter of Plants," "New Plant Immigrants," etc., in the National Geographic Magazine

THE more I thought about it, the more it seemed to me important that my boy should, before his habits of thought and life had become conventionalized, feel the grip of one of the most tremendous of all experiences, that of being all alone in a tropical jungle.

I remembered how my own experiences in the forests of Java had formed a sort of background to all the later experiences of my life and had given me a different outlook upon the world. In the years since then there has been a perpetual longing to return, a longing full of bright sunshine, shady forest scenes, singing birds, strange insect lives, and the mystery of the moonlight through the palms.

Panama somehow had not occurred to me, even though in 1898 I had crossed the Isthmus. It had become, to my mind, a canal, a place of hospital buildings, locks, sanitary inspectors, and fortifications. The tourists who came back from there told nothing of the jungle; they either had not seen any or were not impressed by it. The tourist to Miami talked more about the tropical hammock than the tourist to Panama about the jungle.

But the fact that there was no malaria in the Canal Zone and that we could live there as safely as at home finally riveted our attention upon Panama and we began to analyze its possibilities.

ARRIVAL AT THE JUNGLE

It was summer, midsummer, and one friend wrote: "Why do you think of going to Panama in the hurricane season and the rainy season; it's the worst time to go." Another questioned whether there were any butterflies or any flowers to be seen in the rainy season. But we talked to the men who knew about these things and made up our minds that Panama was the place to visit, and after we left Norfolk every interview on board and every knot the steamer made nearer to the Canal convinced us that we had made no mistake.

To drop your office papers on Wednesday, land at a tropical waterfront a week from the following day, and be chasing butterflies in a gorgeous tropical jungle on Friday was the experience which surpassed anything we had imagined possible. We had had barely time to change our clothes, as it were, before we were actually in that far-away, mysterious place which most people think of as so remote that they can never hope to go there. It was a foretaste of those swift changes of environment which will soon be the common experience of the race when the highway overhead is really opened.

The cool morning ride to Gamboa, past yam patches and cassava fields, with their background of palms and tangled forests, every plant dripping and green, was the first thrill. Then came an eight-mile launch ride up the Chagres to Juan Mina, with superb green hillsides covered with that incomparable mixture of forest trees loaded with hanging vines which is associated only with a heavy rainfall near the Equator.

AS IN A WORLD BEFORE THE ADVENT OF MAN

"Me for the tropics!" was the boy's exclamation, and so swiftly did he disappear up the jungle trail that it was not until two hours later, when he failed to show up, that I realized that I was not quite sure he might not stray too far from the trail itself and be lost in a forest which stretches away for hundreds of miles toward Costa Rica.

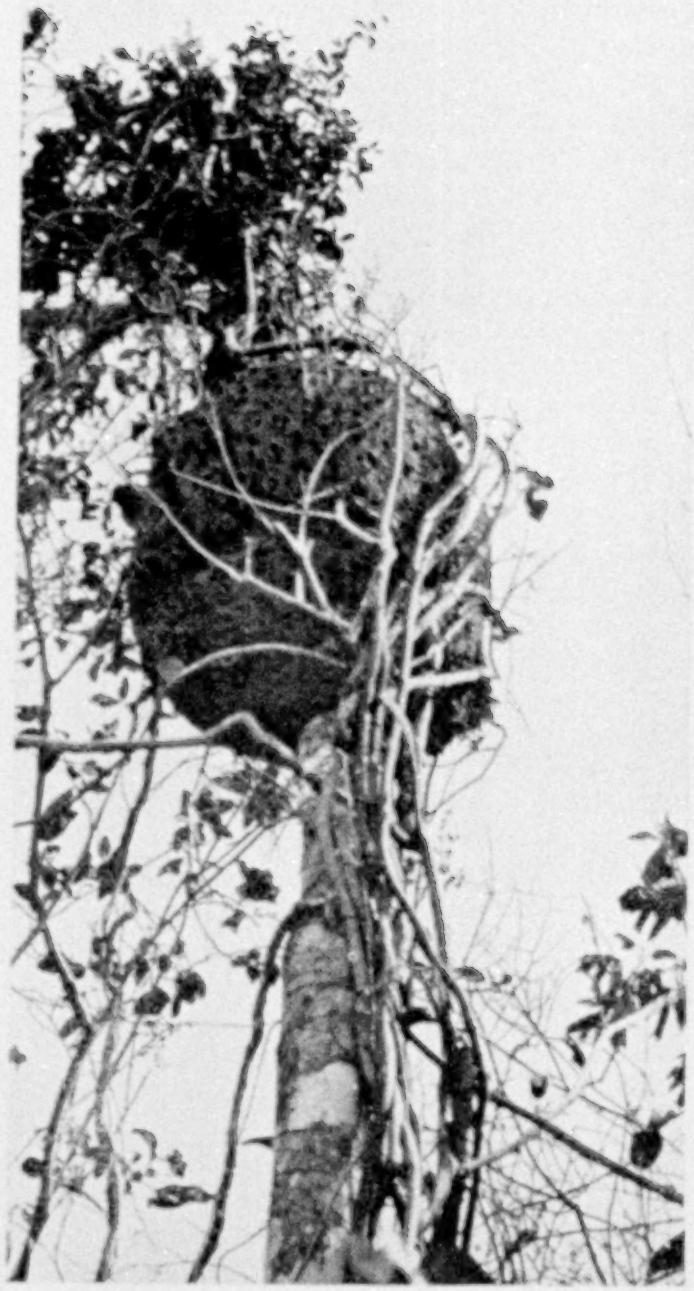
It is a gripping experience and a bit frightening suddenly to find, not houses and lamp-posts and the noisy people who have composed the customary environment and whom one understands, but in every direction and everywhere strange, silent tree trunks, no two alike.

I felt as though I were in the world as it was before man existed. I was where life teems and new forms develop, in the midst of that living stuff up out of which

Photograph by H. Wimmer

A JUNGLE ROAD IN PANAMA

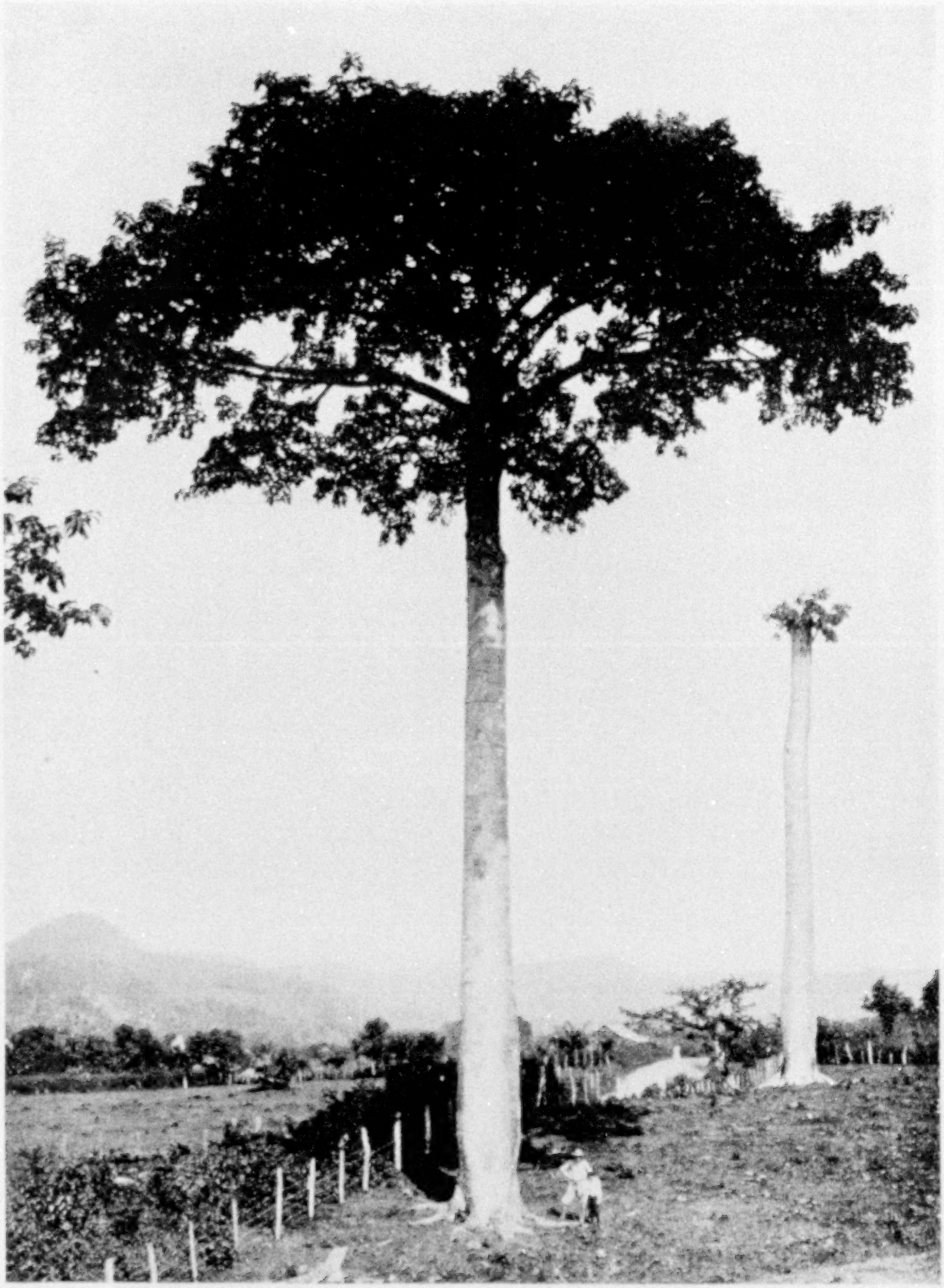
Rank, weedy vegetation and a general unkempt appearance characterize the fringe of the jungle such as that along this primitive road. The plants swarm with insect and fungus parasites, and lianas hang like ropes from the tops of the trees. It is much like a wood road in our South in midsummer.



Photographs by H. G. Cornthwaite

IN THE TREETOPS OF THE JUNGLES OF PANAMA

At the left are nests of weaver-birds, which resemble the oriole nests of the north, hanging in clusters on a tree in Gatun Lake. Often they are built side by side with the nests of wasps and bees, and the stinging insects are said to protect the birds from reptiles. In the center is an old termite (white ant) nest with a strangler fig vine growing over it. Such dark-brown nests swarm with soldiers and workers which have squirt-guns in their heads; when disturbed they eject a fluid whose unpleasant odor is obnoxious to their enemies. These are not mushroom-growing ants. At the right is a large cuipo tree (see page 134) in the dry season. In the branches are the hanging nests of weaver-birds.



Photograph by H. Pittier

THE STATELY CUIPO TREE OF PANAMA

It is a shock to learn that this stately forest monarch, *Cavanillesia platanifolia*, which is one of the striking features of the Panama landscape, is worthless as a timber tree, having wood too soft and spongy to be of any value—at least no use has yet been found for it.

man came ages ago—alone among millions of living, silent creatures. It is one thing to be alone in the desert or at sea and quite another to be alone in the jungle, buried in the very bosom of that great something out of which all life has come.

The world of human beings ceased to be what it had been to me and became merely a fringe of the great life of the world. Things are happening here in this great silent reservoir of life, and these are just as important as those which take place on city streets.

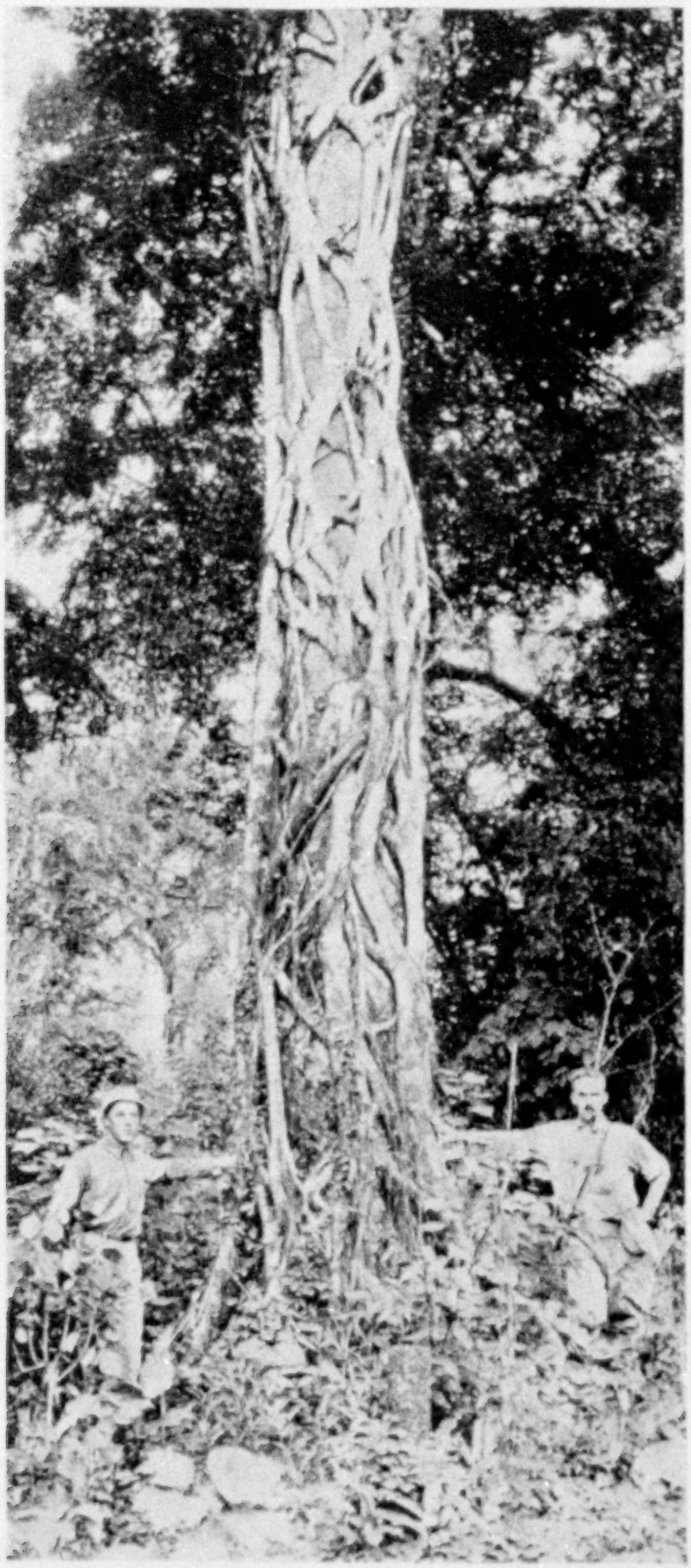
Looking up, we saw the feathery leaves and flowers of the tall, gray-trunked trees or the drooping leaflets of tall, slender palms, or creepers of every imaginable form.

Looking down, there were seedlings *everywhere*—palm seedlings, hundreds of them, coming up from where a bunch of the palm fruit fell and rotted. Ferns of beautiful strange forms and selaginellas cover the fallen trunks and palm stems.

We could not tread a single step off the trail without stepping on some tender little seedling which was as confidently raising its head in the deep shade and constant moisture of the forest floor as if it were on a greenhouse bench.

DEATH AND DESTRUCTION STALK IN THE JUNGLE

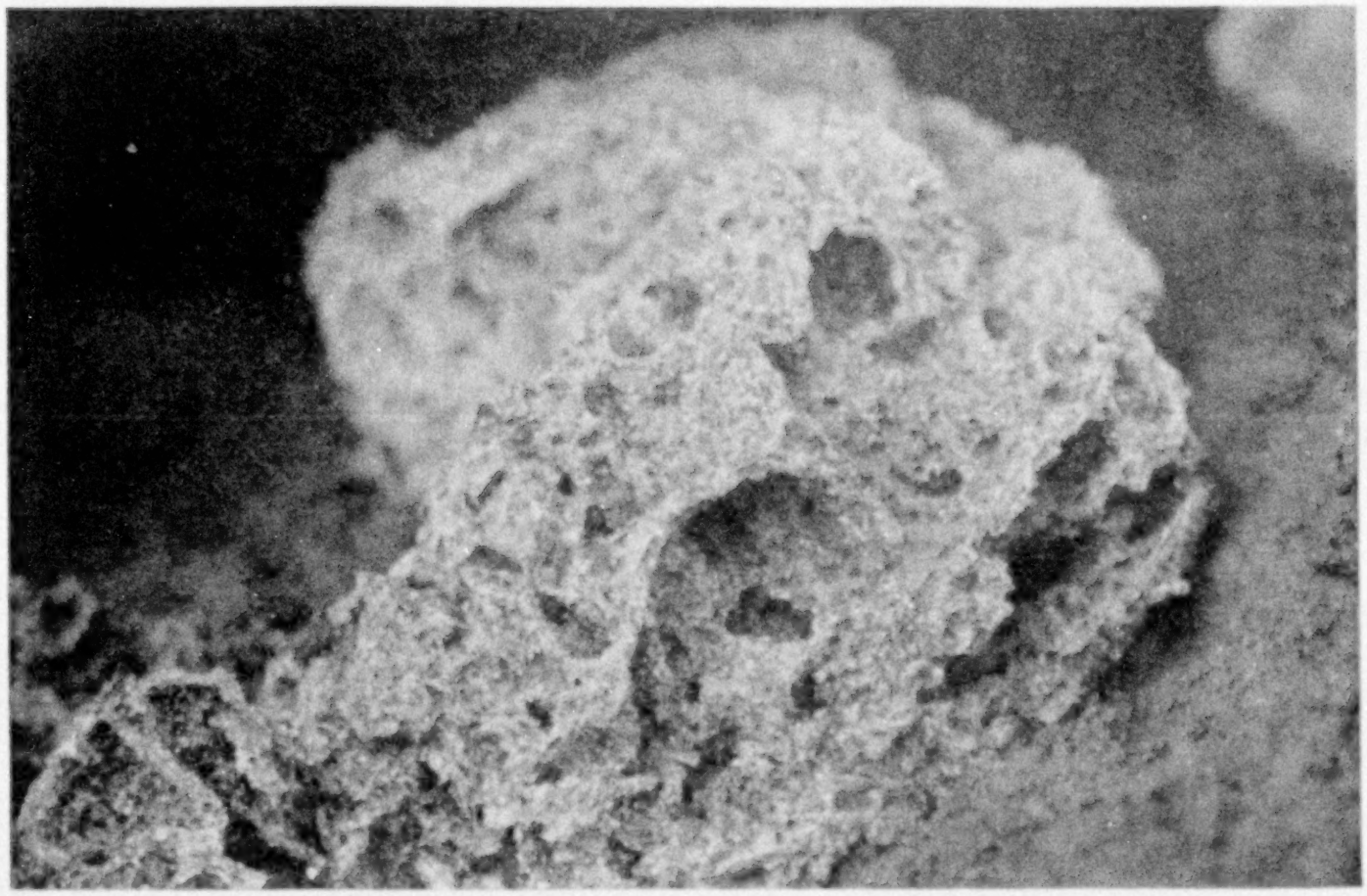
You may imagine that the plants in a jungle are healthy. Far from it! A look around will soon show that there is hardly a leaf in sight which has not some insect-made hole through it. I stood still just off the trail and picked all the leaves within my reach, until I had a handful. Some were so riddled with holes that they looked like lacework; others so tunneled by leaf miners that they looked like gray-green puffed-up bags. Some were spotted with fungus leaf spots;



Photograph by H. G. Cornthwaite

THE STRANGLER FICUS AND ITS VICTIM: PANAMA

From a tiny seed dropped by some bird in the branches of this giant forest tree, there grew a little "rubber" plant, which dropped in time a thread-like rootlet to the ground. This rootlet grew and thickened to a trunk and sent out other rootlets by the dozens, until they quite inclosed the forest tree itself, and some day they will choke it.



Photograph by David Fairchild

THE MUSHROOM SPAWN OF A LEAF-CUTTING ANT; PANAMA

On the floor of a miniature cave is piled this gray mushroom spawn, kept perpetually growing by the leaf fragments brought to it by the atta ants. Everywhere, scattered over the spawn, are the clusters of glistening white mushrooms which form the food of the baby attas (see text, page 139).

others covered with lichens and parasitic algæ.

It was hard to understand why, with all of these diseases rampant, the place should look, not like a plant hospital, but more like a nursery of plants which were all being given the best conditions for growth. There would appear to be enough parasites to wipe out the forest in a few years were things not so nicely balanced, parasites living upon parasites, insects hunting insects.

Every plant pathologist should visit the tropics and take a lesson from the jungle, for if it teaches any one thing it is that inherited resistance to disease and the setting of an insect to catch an insect are the two ways which the jungle species take to escape from their enemies.

THE PHENOMENON OF FATIGUE IN THE TROPICS

Having gone to the tropics in midsummer, it was natural to try to analyze the climatic differences between the banks of the Potomac in August and the banks of the Chagres. I became convinced that the ordinary tools of climatology are not sensitive enough to analyze this difference, just as the chemist's balance can often detect no chemical difference between objects that are easily distinguishable to the palate.

There is a tropical fatigue phenomenon which some people exhibit more quickly than others and which women apparently show sooner than men. Just what it is I do not know, but its results are easily observable. They come generally in the hours between noon and 5 o'clock in the afternoon, and are to the brain what old age is to the eyes. Not only did my eyes blur and have to be rubbed to clear them, but a kind of haziness of fatigue attacked my brain in the afternoon, and try as I would I could not shake it off.

In the morning hours, from 6 to 12, the conditions for active brain-work seemed ideal and I felt ambitious and keen to do things, and there was gener-

ally a period of clear thinking in the cool of the early evening, but from 12 to 4 or 5, there was a pronounced period of extreme fatigue. I wonder if the physiologists have analyzed this effect of a tropical climate, and whether the hours of employment in the tropics really conform to the hours of greatest efficiency.

Hahn remarks in his Climatology that "high average warmth, combined with a high degree of moisture, makes the organism sensitive to slight fluctuations of temperature. In dry climates, on the other hand, the organism withstands great changes in temperature without ill effects."

This is in accord with the surprising experience of cold which one feels in the early morning in the tropics, and also explains why if you stand in the shade at the edge of the jungle and the slightest breeze strikes you, it gives you a perfectly delightful feeling of comfort. If you make the slightest exertion your clothes become wringing wet and your glasses are continually covered with moisture.

You get so thirsty that you feel as if there were no limit to what you could drink, and as the cool water trickles down your throat you are almost ready to declare that it is worth a trip to Panama just to have the experience of quenching such a thirst!

PANAMA'S JUNGLES AMONG MOST WONDERFUL IN THE WORLD

The jungles of Panama are among the most wonderful in the world, so far as vegetation goes. They are not inhabited by tigers and elephants, as are those of Burma and Siam. They do not have gorillas, as do the jungles of Central Africa; they have not the rhinoceros of Java and Sumatra, but the boa-constrictor is there, and they swarm with those brilliantly colored antediluvian lizards, the iguanas; flocks of parrots and parrakeets, and toucans abound. Droves of small monkeys live in the tree-tops, while those weird insects, the leaf-cutting ants, cut their broad pathways like miniature highways of travel criss-cross through its tangled undergrowth.

But it is as rain forests that the jungles on the Chagres might be classed among the most remarkable of the world. They are produced by a rainfall which is, according to Hahn, nearly three times that of Rio de Janeiro, twice that of Guatemala City, about twice that of Bangkok or Calcutta, of Port au Prince and Porto Rico, nearly half as much again as Colombia or Hongkong, and considerably greater than Paramaribo, in Dutch Guiana. It is, furthermore, almost double that on the near-by heights of Balboa.

And here we were actually in this magnificent rain forest, in the cool of the early morning.

A MINIATURE FACE IN THE TREE TOPS

Not a whisper of wind was stirring. Bands of sunlight crossed the trail like those that penetrate a darkened room, illuminating the very air and making it alive with particles of matter. We stood and listened and looked.

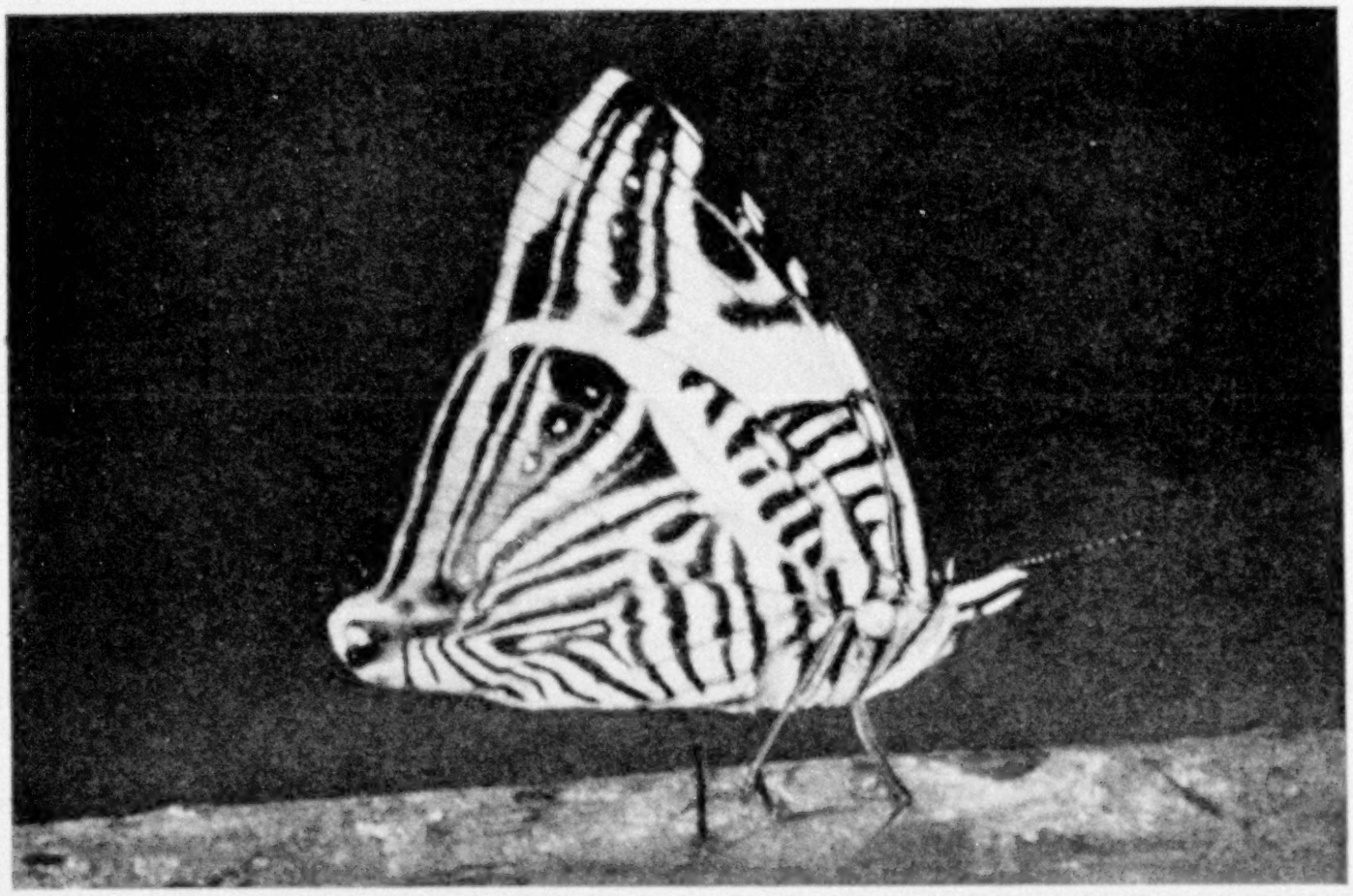
So instinctively does the human eye catch the slightest movement of an object among others which are still, that although millions of leaves shut us in on every side, we both saw instantly a moving leaf in a tree-top from behind which there peered out at us a miniature face.

We recognized at once that this creature with the great brown eyes had a quality that the insects on the trail beneath our feet had not. Suddenly we had come into the presence of a form of jungle life which had at least a resemblance to the form which is covering the globe with cities and cutting down the forests.

It is strange to speculate about this greatest of occurrences—the arrival in the animal world of that organ, the brain, which came into existence, or at any rate found its great beginning, in the tree-tops of a tropical rain forest.

There we two descendants on the ground stood staring at the tiny descendant in the branches. How far, how incredibly far, our pathway of descent had taken us in the thousands, perhaps millions, of years since those days in some tropical rain forest when the first super-apes, more intellectual than the rest, broke into the swift pace of evolution which led to man!

And how that creature in the tree-tops had lagged behind—so far behind that any kinship even seemed more imaginary than real. Yet intelligence was there—the spark, the something, that made of



Photograph by David Fairchild

WHICH WAY IS THE BUTTERFLY GOING?

If a bird sees it sitting on a branch, does the appearance of doubleheadedness deceive? And did the ancestors of this butterfly increase their chances of survival in the struggle for existence by their strange appearance, or is it just a coincidence? These questions are hard to decide experimentally.

that tiny creature a very different thing from the insect creatures of instinct at our feet, whose perfect organization is enough to "strike terror to the heart of any individualist."

ANTS THAT CULTIVATE MUSHROOMS FOR THEIR YOUNG

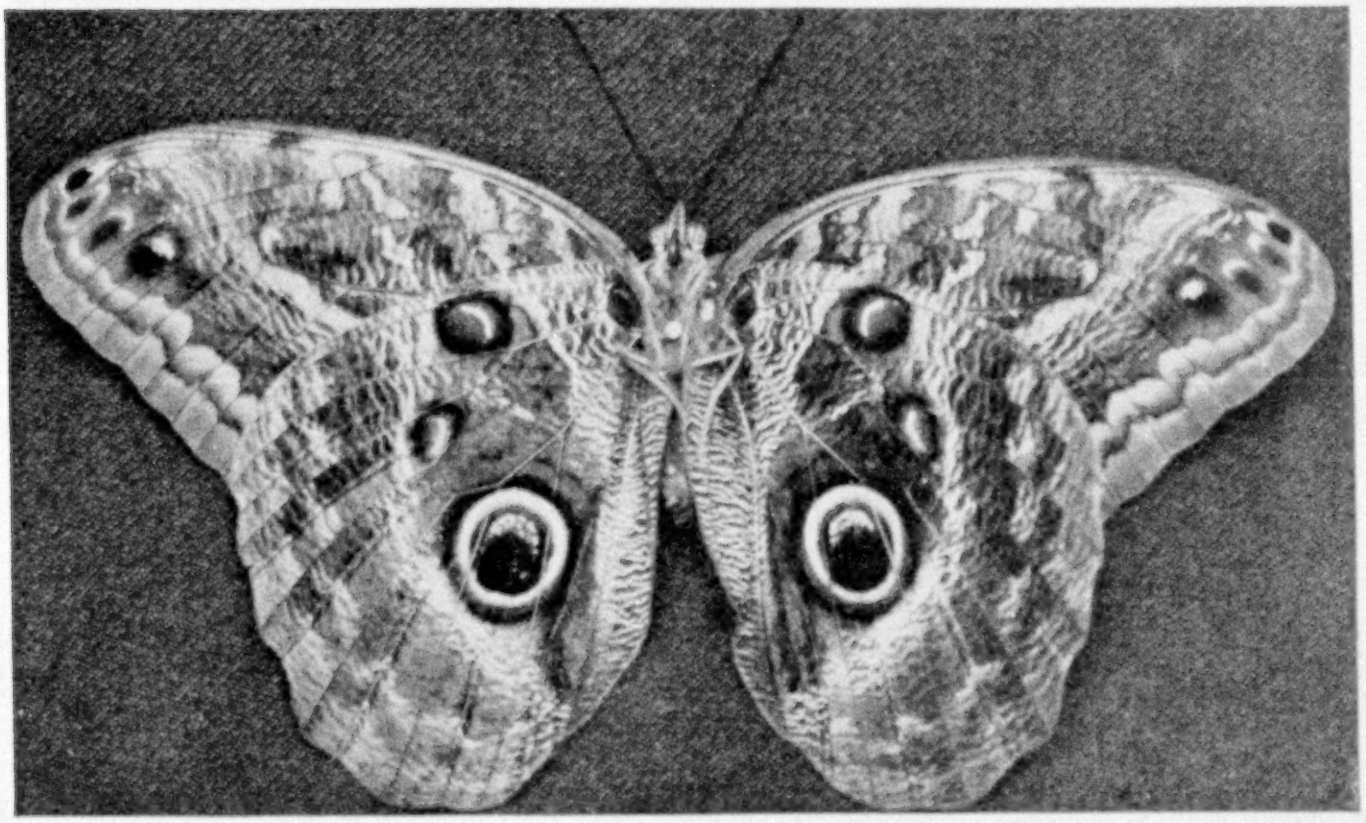
There are many differences, botanical and zoölogical, between the forests on the Chagres and the rain forests of the Malay Archipelago; but to me the most striking was right beneath my feet—the beaten trails of the attas, the leaf-cutting, mushroom-growing ants. There are none of these trails in the oriental jungle, for the atta does not inhabit them. There is a mushroom-growing insect in the East, a species of termite, or so-called white ant, which is not an ant at all; but the termites build covered mud runways and not open well-kept highways like these of the attas.

I wanted most of all, in coming to the Chagres, to have two experiences: I wanted to see a real boa-constrictor—see its long, trunk-like body move swiftly across the trail and watch it disappear among the trees, or look up into some tree-top and see its long, narrow head and the coils of its scaly body far above me in the forest—and I wanted to see the mushroom gardens of the attas.

The boa-constrictor is fast becoming a rare animal on the Chagres, and I did not see one; but I did have the pleasure of digging out an atta mushroom garden.

One may have watched an atta under a lens and have seen it deliberately scissor out a circular disk of green leaf, throw it over its head, and hurry down the leafy twig to the tree trunk or down to the ground, and then away, at the rate of two yards or so a minute, over a beaten highway as clear of leaves as a swept pavement and, compared with the size of the atta, as wide as a city street.

One may have watched it disappear into its hole in the ground, but until he has actually dug down deep into the stiff clay and found there, in subterranean caves, the mushroom beds of these creatures, he can scarcely realize the full



Photograph by David Fairchild

THE GREAT OWL BUTTERFLY WHICH FLIES AT DUSK: PANAMA

When the author first saw the wings of this remarkable butterfly through the camera as he took its photograph, he was startled by its resemblance to an owl's face. Its eye spots seemed almost luminescent and it could easily be imagined that an owl was flying at dusk. If held at arm's length and viewed with almost closed eyes, the reader can readily imagine he is looking at an owl.

length to which the strange force of instinct has carried them, whose form and probably whose gait has not changed in hundreds of thousands of years.

POSSIBLY THE WORLD'S FIRST "AGRICULTURISTS"

There, in the cavern, lies a mass of mushroom spawn as delicate to the touch as cobwebs are, and embedded in it everywhere are the bits of leaf brought by the attas, hundreds of yards over their highways, for its nourishment.

If you take this spawn carefully out into the sunlight, countless groups of sparkling, almost microscopic, bodies are apparent. These are the mushrooms. It is upon these that the baby attas feed. I wonder if these mushrooms are not the oldest cultivated plants in the world, and this cave agriculture of the attas the most ancient of all agricultures.

To enter the great tombs of Egypt and see the mummy cloth of a Pharaoh is to look at the handiwork of beings which lived three thousand years ago, but to open the mushroom cave of an atta is to come into the presence of an instinctive agricultural practice which probably began long before the Cave epoch of mankind and has been continued down to the present time.

There appear to be no weeds in the shape of other kinds of mushrooms growing in these nests. How do the attas keep them out, and does the crop ever get diseased, I wonder! It is things like these, which you feel have been going on uninterruptedly for eons with feverish haste, that make the jungle what it is, a place in which to think and wonder.

The little laboratory at Juan Mina, where we spent six days, stands in a citrus grove established there some years ago, and for naturalists to live and work in it is a wonderfully comfortable and convenient place. Carefully screened, equipped with running water and cooking-stove, it overlooks from a slight elevation the famous Chagres River, famous for its deadly black-water fevers, which in the days of the California gold seekers made the trail across the Isthmus, which passes through the jungle behind the laboratory,

XUM

Photograph by David Fairchild

A GIANT LIZARD, OR IGUANA, OF TABOGA, AN ANTEDILUVIAN REPTILE

The brilliant colors and the curious flopping horns along its spine make you sure that this creature is a left-over from the Age of Reptiles (see text, page 142).

one of the most dangerous spots in the world.

THE FEVER-BEARING MOSQUITO IS VANQUISHED

There was a curious thrill of pleasure in being near this spot and feeling safe, safe from that microscopic enemy which when I crossed the Isthmus before was wholly unidentified, unknown, but which now, through the investigations and activities of personal friends of mine, whose early plans and dreams I heard them talk about, is known and whose ways are understood. To those like L. O. Howard and Theobald Smith, whose scientific curiosity led them into this field of discovery, should go quite as much of credit as to the inventors and organizers like Gen. Gorgas, who mastered the mechanics of mosquito destruction.

I do not mean to give the impression that there is no fever left on the Chagres, for there is; but if one keeps behind well-built screens after sundown and before sunrise, which, according to Dr. Zetek, is the time when the female anopheles fly, the danger here is insignificant—no greater, perhaps, than danger from colds in northern climates.

GRASS PROBLEM APPALS THE PLANTER

A Florida orange-grower would turn gray if he had confronting him the problems which face any one who attempts to grow fruit in Panama.

The grass problem alone is enough to stagger the heart of the bravest planter. Think of your own vegetable garden in midsummer, when the days are steaming hot and the weeds are growing about as fast as you can pull them out; project these conditions indefinitely, for there is never any winter to check them, and you will get the endless vista of weeding which confronts the tropical planter.

Grass is certainly the curse of agriculture in the rainy tropics, and he who imagines tractor-work or the use of any of the ordinary tools of our northern agriculture in use on tropical farms should never lose sight of the grass.

There is really nothing so hopeless-looking to a northern fruit-grower as a little orchard in a clearing in a tropical jungle. The great forest insists on taking back the little clearing to itself, and it is one continual fight with a machete to keep it from doing so.

When I was shown what looked from the deck of a launch like virgin forest,

Photograph by David Fairchild

SIX GIANT LIZARDS, THE BAG OF A SUNDAY MORNING

Why any one who eats eels and terrapins and snails should shudder at the idea of eating lizards is hard to understand; but many do. To the Taboga people they are as great a delicacy as the terrapin is to us.

with great trees covered with creeping lianas, and was told that it had all grown up in eight years from cleared land, and when I recollected how fungus and insect pests haunt a clearing, I could better comprehend the feeling that, after all, for the individual of small means, there really is no other way to farm than to cut down and burn, plant and get a crop or two; then, when the plants and weeds of the returning forest drive you out, move on. It is the way of the native everywhere; clear a spot, rush in, rush out again, and let the land grow up to trees.

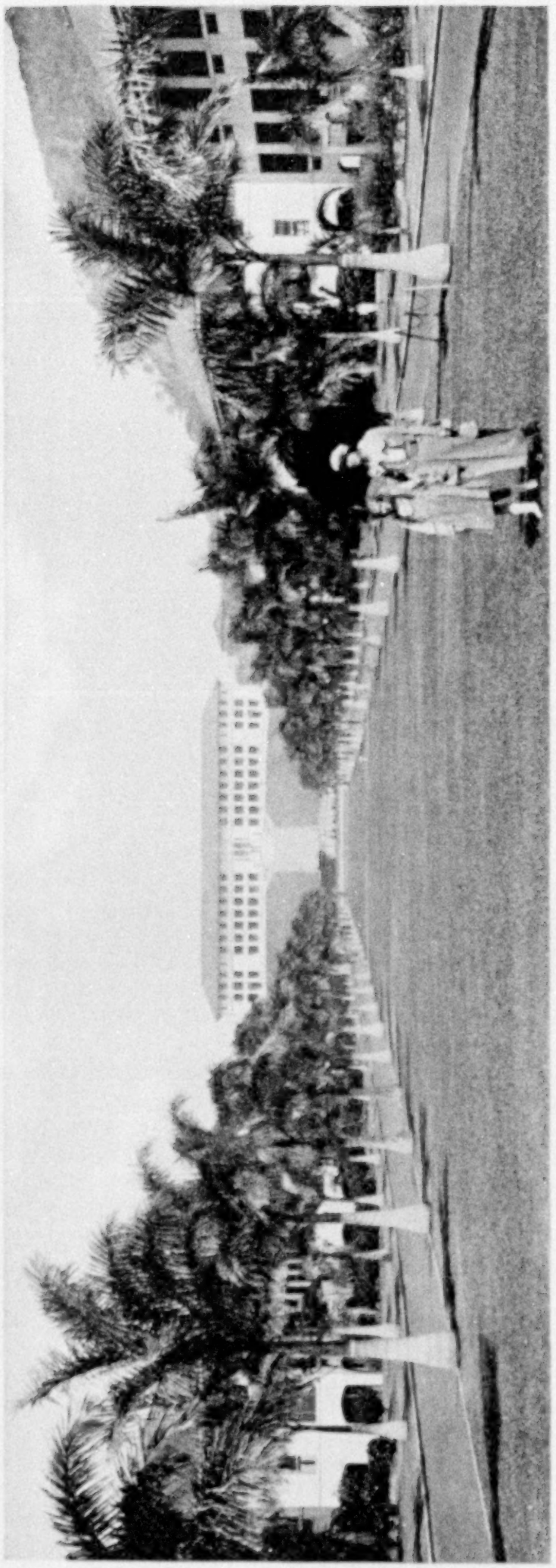
UP THE CHILIBRE RIVER IN A CAYUCO

To paddle up a strange river in a canoe is thrilling, even in the north; every turn in the stream opens a new vista. But to sit in a real dugout made from a giant tropical forest tree, with the beautifully developed, half-naked form of an Indian in front of you, where every move of his lithe body changes the shape of the brown statue before your eyes; to be so near the dark, still, swift water that your hand touches it and can pick up floating fruits as they pass, and noiselessly to thread your way under palms and great lianas up a tropical stream, is an experience of a lifetime.

Hushed by the stillness of everything, nerves keyed up by the instinct which comes when you take a gun in your hand, and guided by natives whose eyesight is so keen that they can see a green snake lying on a branch forty yards away, my son (Graham) and I pushed up the Chilibre, and up it to the Chilibrillo, in a cayuco.

Not in those parts of Java or Sumatra where I have been, nor in the South Sea Islands, nor anywhere around Rio, not even in the Moluccas, have I seen anything which approached the luxuriance of the banks of vegetation between which we were noiselessly gliding.

"Culebra! Culebra!" whispered the Indian in front of me, and we darted under overhanging branches to get a



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THE ADMINISTRATION BUILDING AND THE APPROACH THROUGH THE ROYAL PALM AVENUE: BALBOA, PANAMA

When will some genius of landscape gardening be given an opportunity to use the plant forms and colors of the tropics? This palm avenue will grow more stately with age. It is a fragment of the unfinished plans for the landscaping of Balboa.

closer view of a tree-snake which refused to come down, even after being shot at.

A few yards farther up stream one of those weird, unworldly green lizards lay flattened against a limb. A 22 shot brought it down into the undergrowth and we pulled into the slippery mud bank to get it. A parrot in all its gorgeous plumage is no more brilliant than one of these great lizards of the Chilibre. They must be seen before their colors fade to be appreciated; when stuffed they look like any other reptiles.

With varied luck and exciting incidents we pushed on to where the Chilibrillo enters the Chilibre and branched off into the smaller stream, so narrow that in places the fallen tree trunks almost blocked it, and as we stooped to avoid the hanging vegetation we involuntarily scanned it for snakes, which love to lie on the branches projecting over the water.

A NATIVE HOME IN THE JUNGLE

We left the stream and followed the Indians to a typical native house in a clearing in the jungle.

It was with a peculiar feeling of racial curiosity that I walked around this little farm-yard in the jungle on the Chilibrillo. There, in a hammock swung between the posts that supported the thatched roof, lounged the woman, and in the little patch of upland rice near by worked the man, cutting the long heads of half-ripe grain one by one with a small knife.

XUM

Photograph from Roscoe Searle

DEFEATED BY THE MOSQUITO AND ABANDONED TO THE JUNGLE

This French dredge was the giant of its time. It had to be abandoned, and the jungle has smothered it, because the engineers who built it had not counted on the mosquito. The discovery that the mosquito is a carrier of parasites constitutes the real beginning of the White Man's conquest of the Tropics.

The palm-thatched roof covered a closed-in room and an open one. A fireplace, a wooden pestle and mortar in which to hull the rice, a table of peeled poles, a little storehouse near by, and that was all.

I turned away from this primitive farm-yard with doubt that from such homes as this will ever come the human stuff which will master the tropics.

An approaching thunderstorm, with its banks of threatening clouds and claps of thunder, so characteristic of the summer season, hurried us back to the cayuco, and noiselessly we slipped downstream.

Graham had winged a Jacana, which dropped into the tall grass on the bank, and had just landed to get it when something so blue that it startled me flashed in an irregular course over my head and alighted somewhere behind a clump of trees on the edge of the swamp. I had never before seen a live morpho butterfly.

I had not realized that seeing one would be comparable to one's first sight of a ruby-throated humming-bird; but it is, and the excitement of that wholly unequal chase, handicapped as we were by the swamp, and our bitter disappointment at seeing the gorgeous thing, like a flash of blue sunlight, disappear into the forest, constituted one of the most vivid experiences of the whole trip.

THE BEAUTIES OF TABOGA ISLAND

Taboga was a great surprise. I was told that it was worth seeing; that it had a drier climate than Panama, and that delicious pineapples grew there; and Graham had been shown specimens of the gigantic bird-catching spiders which Dr. Zetek had said would jump at any one who disturbed them in their lairs beneath the rocks. But nobody prepared us for the peculiar beauty of this charming little island in the Pacific. The charm of it lies in its blending of Mediterranean architecture and tropical vegetation.

Here, clustered in a little valley surrounding an incomparable little beach, like the beaches of the Adriatic, was a century-old tile-roofed town with every line in it harmonious. I felt as if we had stumbled into a bit of old Spain.

The moon was just rising out of the sea when we landed, and our first glimpse was of the little plaza in the town. There were the youths and maidens, the evening social promenade, the sea, the soft Spanish voices, and the heavy perfume of the tuberoses in the borders. I thought of Funchal and Amalfi and of little villages on the Adriatic, but everywhere the palms and giant mangos and sapodillos broke the illusion and added an indescribable beauty to the scene.

But I cannot possibly condense into a few pages the impressions of a month in Panama. To my mind the Canal Zone is an oasis, spiritual as well as physical, in the very heart of the humid tropics. It is an oasis which has been built on a sufficiently large scale to show what can be done toward making a tract of land four times as large as the District of Columbia as safe a place to live in as the District itself, although surrounded on all sides by tropical jungle in which lurk all kinds of diseases which have for centuries devoured the white man whenever he has ventured into its shadows.

OUR COUNTRY'S ATTEMPT TO CONQUER THE TROPICS

So far as I have seen, this is the first time in history that a northern race has comprehended, and shown that it comprehended, the gigantic scale upon which it will be necessary to operate if the white races ever conquer the tropics.

Much has been said about the inability of the white race to live there. Perhaps it cannot live there as the brown and black races do; but, for all that, it can and will accomplish great changes; and the development of the Panama Canal Zone, with its sanitation, transportation facilities, its admirable hotels, and its stirring intellectual life, stands as a brilliant example of what the future may bring in the development of the gigantic resources of the tropics.

It is from this standpoint that I think one should view the accomplishments of our country and urge it to go on with the research work which it has begun, and make here, in this frontier post, the discoveries without which the scientific conquest of the tropics will be impossible.

We have greatly underestimated the problem of the tropics. It is one which should invite the greatest research talent which we have and be supported by our millions. The agriculturist who tackles

Photograph by David Fairchild

A FEW MINUTES AFTER SIX: MORNING SCENE AT TABOGA, PANAMA

With some of the character of a South Sea island, but with a century-old civilization, Taboga is the picturesque gem of this whole region, and at sunrise its coast has few rivals in tropical beauty.

the jungle single-handed and tries to farm within its shades is about as likely to succeed as would the man who tried to raise turkeys in a game preserve.

The parasites are legion; they attack every form of plant and animal, and most of them can only be seen through the tube of a microscope. It will constitute the life-work of hundreds of research men to find out their habits and how to circumvent them, and one of the best places in the world to do this could easily be the Canal Zone, were it only equipped with the special laboratories, insectaries, plant nurseries, trial gardens, and other paraphernalia of biological research.

If this work were to be handled on the same large and comprehensive scale that has characterized the engineering operations on the Zone, and not on the small unit "Experiment Station" basis, the world would be amazed at the results, just as it is today at the magnificent work of American engineers.

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AN OLD CATHEDRAL WHICH ONCE CONTAINED THE BONES OF A COLUMBUS: HAVANA, CUBA

When Haiti, the Island of the Twin Republics, was ceded to France, at the close of the eighteenth century, the bones of some one who was thought to be Christopher Columbus were transferred to Havana, where they remained for a time in this cathedral before they were taken to Spain, in 1898. It is now believed that only the bones of a kinsman of Columbus were taken back to the Old World, and that Santo Domingo is still the resting place of the great discoverer.

THE HAUNTS OF THE CARIBBEAN CORSAIRS

The West Indies a Geographic Background for the Most Adventurous Episodes in the History of the Western Hemisphere

By Nell Ray Clarke

SINCE the dawn of American history, the Caribbean, "that sapphire and emerald sea which creams to white" upon the sands of the magic islands that inclose it, from the eastern coast of Florida to the eastern shores of Venezuela, has been the scene of a romantic and cataclysmic life.

Beneath flaming tropical skies and heavy scudding clouds, earthquakes have tumbled parts of these palm-fringed islands into the hungry waters; volcanoes have spouted fire upon panic-stricken and powerless natives; great navigators and early geographers braved its hidden shoals and treacherous reefs, and buccaneers, hiding like wolves in their lairs among the countless excellent harbors which the islands afford, once were wont to spring upon the gold-laden Spanish galleons, carry off their booty to some lonely island retreat, and there divide the loot to be spent in riot and debauch in the cities of the Main.

Across the routes where once the wealth of the Incas was borne to Spain went American men and materials for one of the most stupendous engineering undertakings in the history of man—the Panama Canal.

STILL A REGION OF ROMANCE AND OF FANCY

Though the area is fast achieving a prominence which will not be servile to its former glory, romance and mystery have not forsaken the happy hunting ground of the sea rovers of the Spanish Main. Within recent months there have been reports that a phantom craft has been sighted somewhere along the North American coast, and the loss of some of our merchant vessels has been laid by the imaginative at the doors of men who are supposed to have developed a "pirate complex" as the result of six years of ruthless war at sea.

Columbus declared that the shores of the Caribbean were an earthly Paradise, "the most beautiful lands in the world, and very populous." In his letters he named the mainland Tierra Firme.

The sixteenth century privateers and pirates — fearless, erratic, adventurous spirits—though they turned this body of water into a veritable Spanish cockpit, at the same time discovered lands, developed the art of seamanship, and added greatly to the world's knowledge of natural history and geography.

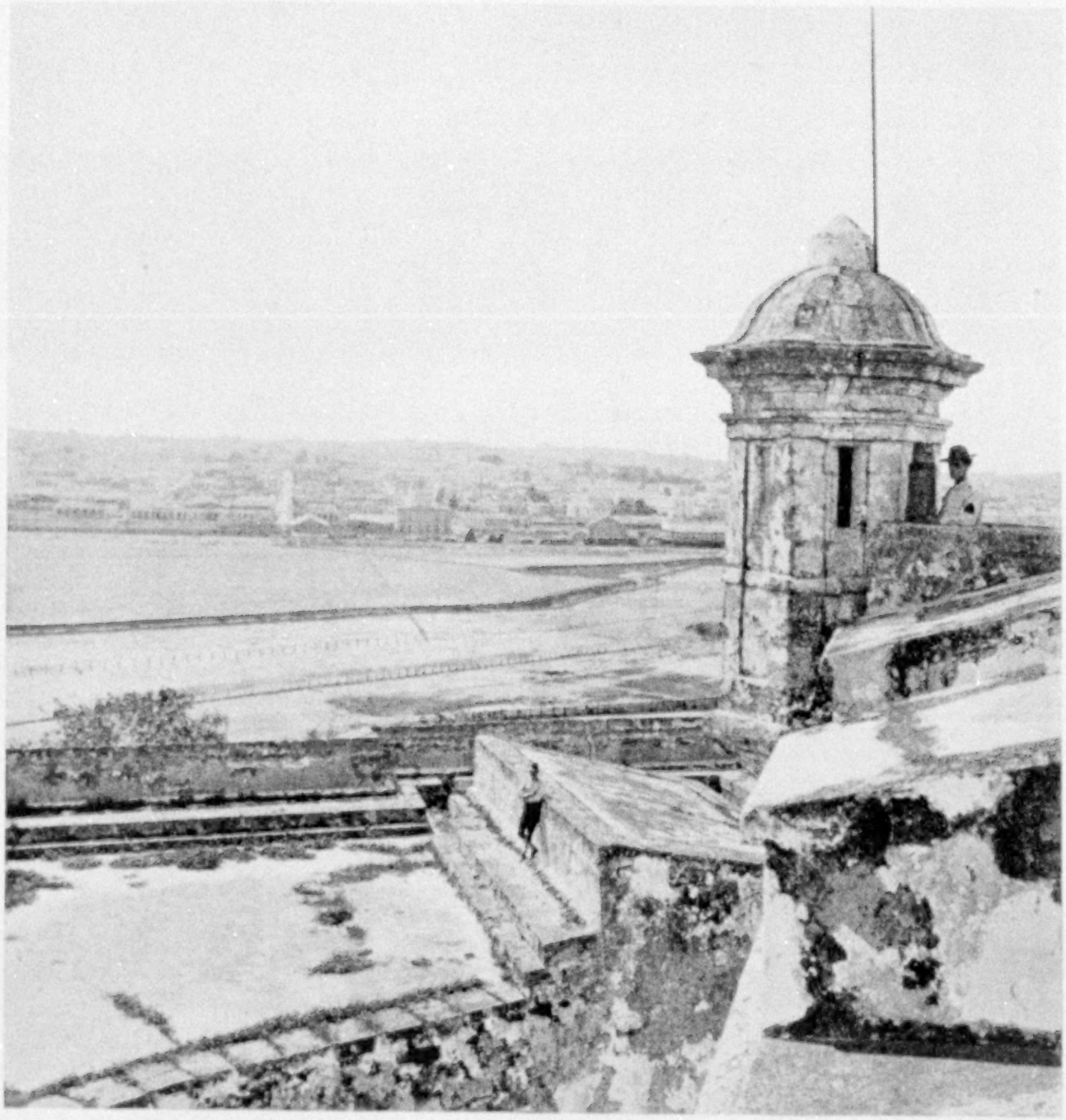
Shortly after the discovery of America, Spain, at the height of her power, claimed all of this domain as her own, and trespassers were regarded as pirates. Though the richest half of Europe was then emptying gold into the coffers of Aragon and Castile, it is estimated that one-third of the imperial revenue came from Spanish colonies in the New World.

But Spain was not permitted to establish her sway in the Western Hemisphere unchallenged. Both England and France were puissant rivals.

With the English seamen of the sixteenth century, who were gentlemen adventurers swearing allegiance to Elizabeth, came French corsairs, Dutch zee-rovers, and nondescript bands of smugglers, slavers, traders, and privateers to infest the West Indies.

This motley crew was followed by the buccaneers in the seventeenth century and by ordinary pirates in the eighteenth.

As a consequence, there is scarcely an island among the hundreds in the Caribbean that has not its story of these early adventurers, and many bits of land reveal today definite marks of their handiwork. There is not a stretch of coast twenty miles in length which does not have its story of buried treasure. And to pique one's curiosity and arouse his enthusiasm, occasionally there drifts on shore in these regions a queer old coin, a doubloon or



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LOOKOUT TOWER ON THE OLD FORTIFICATIONS: HAVANA, CUBA

Captain John Davis, with his pirate vessels, cruised outside the well-fortified harbor of Havana before he set sail for the Florida coast, where he sacked St. Augustine in 1665.

moidore of Charles I or Philip II, a fragment of a chain, or a formless piece of bullion.

THE BUCCANEER WAS A PICTURESQUE FIGURE

The buccaneer was a picturesque fellow. His motto usually was, "A short life and a merry one." He seldom recognized allegiance to any country or crown, nor did family ties mean anything to him. He clothed himself in gorgeous finery when his purse was full, weighting down his ears with rings, his arms with bracelets, and his neck with chains, only to sell his jewelry and wear his apparel in tatters when his purse was lean, but always retaining in the days of adversity his gorgeous sash, as a sort of red badge of courage, and his villainous knife.

He was to be found wandering the streets of the semi-medieval Spanish towns of the New World, elbowing his way among swaggering soldiers, traders, Negroes, Indians, fair ladies, and assassins.

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A MARKET SCENE IN GUANTANAMO: CUBA

It is no unusual sight to see the peon women of Cuba puffing big black cigars. Frequently they stroll along the streets barefooted and smoking as nonchalantly as men.

There was practically no colony in the island-dotted Caribbean which had any scruples against allowing the buccaneers to build, fit out, or repair their vessels in its harbors. Tortuga, off the northern coast of Haiti, and Jamaica were veritable pirate strongholds, while Martinique, Curaçao, St. Kitts, and Barbados befriended them and encouraged their trade.

The home governments of France, England, and the Netherlands found it good policy to countenance the buccaneers and to wink at some of their activities. The Council of Jamaica even went so far in 1666 as to enumerate in its minutes twelve good reasons for granting commissions to privateers; for, this august body said, they furnished the island with necessary commodities at easy rates, bringing them coin, bullion, cocoa, logwood, indigo, and cochineal; helped poor planters by buying the provisions they had for sale; furnished work for various kinds of artisans; brought slaves to cultivate the plantations; furnished a navy for the island; and often, in intercepting Spanish messages, furnished the governor of the colony with valuable information.

The nursery of all the English and French colonies in the West Indies was St. Christopher, or St. Kitts, as it is now so often called, one of the Leeward Islands, half way between Porto Rico and Dominica. It was discovered by Columbus on his second voyage to America and called by him after the saint whose name the great discoverer himself bore (see illustration, page 179).

Though today almost every available inch of its deep and fertile soil is cultivated, St. Kitts is poverty-stricken, owing to overpopulation. Its seventy square miles are encircled by a good road, and the heart of the island is made up of a series of peaks broken by wild ridges and ravines, which culminate in a great quiescent volcano towering more than 4,000 feet above the sea, in whose crater there lies a peaceful lake.

A TOY TOWN HIDDEN IN THE CONE OF A VOLCANIC MOUNTAIN

Off the southeastern tip of St. Kitts lies Nevis, where Alexander Hamilton was born and where Horatio Nelson was married, and to the northwest of it lie the

Photograph from N. H. Darton

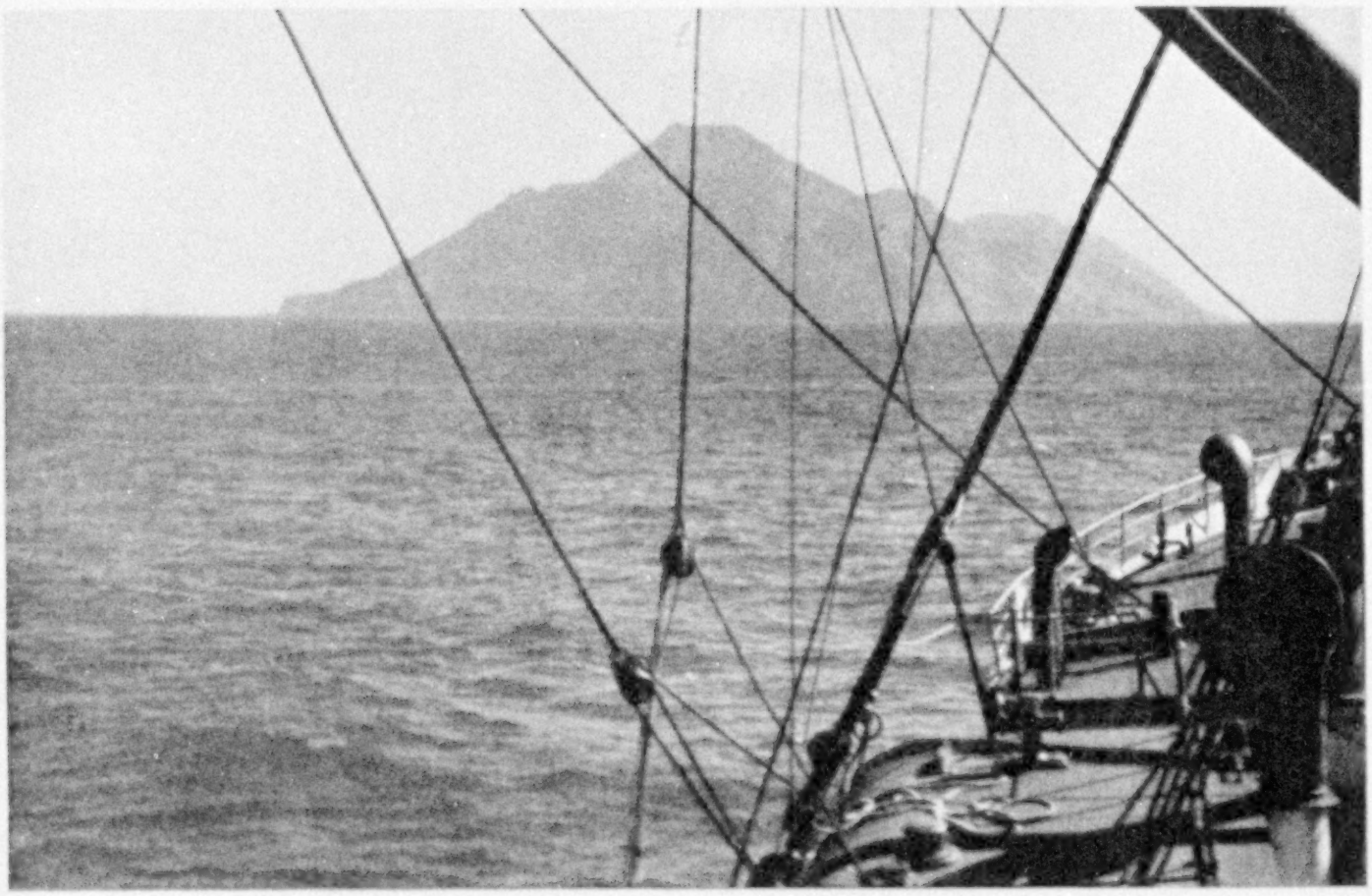
A CITY WHICH OWES ITS ORIGIN TO PONCÉ DE LEON: SAN JUAN, PORTO RICO

When this noted early explorer saw the well-drained peninsula and its nearly land-locked harbor, on the northern side of the island, he decided upon the site as a home for himself, and here he built his Casa Blanca, or White House, which still stands in its walled-in garden (see text, p. 173).

Photograph from Willard Price

A SHADE-TOBACCO PLANTATION IN PORTO RICO

Early explorers marveled when they first encountered natives with firebrands of the "weed" in their mouths. In 1920 Porto Rico exported nearly 225 million cigars, more than 5 million cigarettes, and 20 million pounds of leaf and scrap tobacco. The "shade" is of cheese-cloth, which not only protects the plant from the scorching rays of the sun, but also from insect pests.



Photograph by Herbert Turner

LITTLE SABA, WITH BOTTOM AT ITS TOP

This Dutch island is nothing more than a quiescent volcano protruding from the sea. A sailor once flippantly dubbed it "Napoleon's Cocked Hat," because of a fancied resemblance to the Emperor's headwear, and the geographical nickname has stuck to it.

Dutch-owned St. Eustatius and quaint little Saba. The latter, barely five miles in diameter, looks from the sea as if it were uninhabited; but tucked away inside the cone of its single volcanic mountain a seafaring people have built their toy town with white-walled and red-roofed houses, which, with a characteristic Dutch mental quirk, they have named Bottom. Up and down the sides of the mountain to the sea they are content to run several times a day, to engage in fishing, which furnishes them a livelihood (see illustration above).

The waters in the vicinity of the Virgin Islands, from the time of Sir Francis Drake, were frequented by sea-rovers of every class and description. Because of the numerous islands in the group, Columbus, when he saw them, on St. Ursula's day, named them after her eleven thousand virgins, and the "Virgins" has clung to them, a group name, though the sea-rovers rechristened numerous points in the cluster with names that irreligiously smack of pirate lore, such as Rum Island, Dead Man's Chest, Salt Water Money Rock, Flanagan's Pass, Dog Rock, Fallen Jerusalem, and Beef Island.

ST. THOMAS, RENDEZVOUS OF BLACKBEARD'S MEN

The Virgins lie less than fifty miles east of Porto Rico. The three principal islands, St. Thomas, St. John, and St. Croix, as well as many of the 100 or more lesser units of the group, are plainly visible from the deck of an approaching steamer (see illustrations, pp. 162, 174).

Life was turbulent in St. Thomas in the days when Edward Teach drove his lean pinnaces, filled with half-naked cutthroats—black, white, and yellow—into the pretty harbor at Charlotte Amalie (now officially known as St. Thomas), built his castle on one of its hills, and scoured the seas for the slow-moving, carved and gilded Spanish galleons, which were hauling the wealth of the Indies to the mother country. This adventurer even dared to anchor his pirate craft as far north as Charleston, South Carolina,

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THE OLDEST CHURCH IN PORTO RICO

The little town of San German, in which the ancient Dominican monastery stands, was founded in 1511. It is located in the western part of the island, where more than eighty years ago earthquakes were so continuous for a period of six months that it is said pots and pans refused to sit on the stoves. The inhabitants ate their food raw.

and to share his prizes with the Governor of North Carolina, his colleague, while he was still sentimental enough to marry, as his fourteenth wife, a charming creature of sixteen.

One of the chief points of interest in the picturesque little town of Charlotte Amalie, which has one of the best harbors to be found in Caribbean waters, is the castle of this redoubtable king of his kind, known in the sphere of his influence as Blackbeard. As a matter of fact, his queer "castle" looks more like an exotic species of windmill with its arms lopped off (see illustration, page 155).

Here, so the story goes, the mighty brigand fortified the excellent vantage point from which to spy out any vessel that ventured near his haven. On the opposite hill there is another fortress, which is called Bluebeard's, but the history of this pirate is sunk in oblivion.

Blackbeard's existence was, however, a vivid reality. He won his name because of a heavy black beard, about which he was exceedingly vain. It is said of him that he twisted this mane into small tails and tied them with ribbon and fastened lighted tapers under his hat to illumine his repulsive features and wild eyes, thus striking terror to the hearts of his victims.

The English colonies along the Atlantic seaboard being at the limit of their endurance, the Governor of Virginia offered a price for Teach's head. Lieutenant Maynard found him resting in Ocracoke Inlet, North Carolina, and there ensued a hand-to-hand encounter between the principals, which resembled Scott's description of the duel between James Fitz-James and Roderick Dhu. Finally the pirate dropped to the deck; his head was severed and attached to the bowsprit of Maynard's sloop and was carried triumphantly to Virginia.

ADMIRAL PILLSBURY'S NAME GIVEN TO "THE SOUND"

Between St. Thomas and St. John, hedged about by a chain of small islands that guard it from heavy seas and high winds, lies an excellent harbor, which

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BLUEBEARD'S CASTLE: CHARLOTTE AMALIE, ST. THOMAS

No one knows how this old tower gained its name, but active imaginations have woven fascinating stories about it. It was in reality built by the Danish Government during the latter part of the seventeenth century and remained the property of the king until about a century ago, when a private citizen obtained possession of it (see text, page 153).

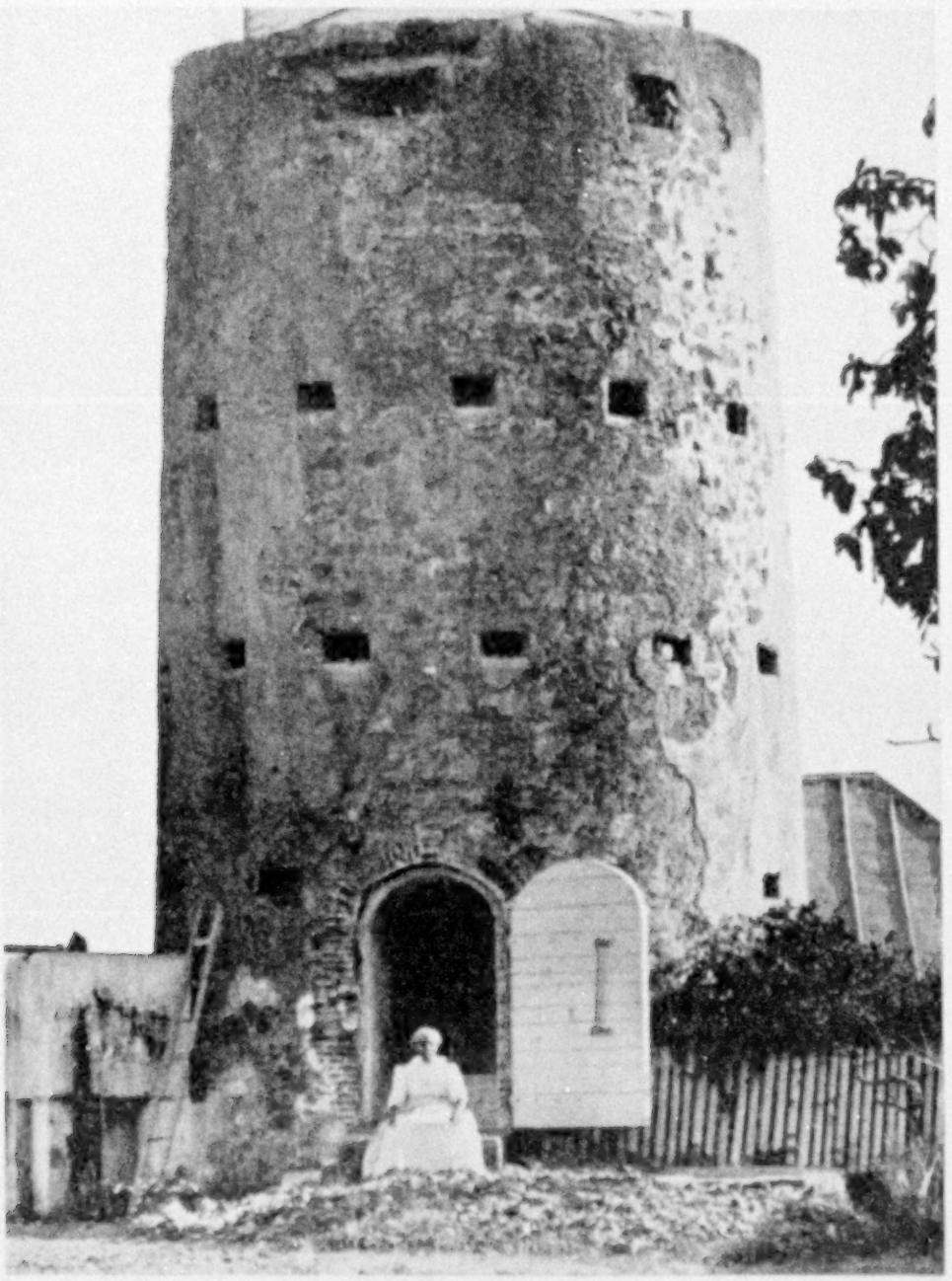
must have proved a satisfactory refuge for many of the old renegades. For centuries it was indefinitely dubbed The Sound; but a few months ago the United States Geographic Board, upon the recommendation of the United States Coast and Geodetic Survey, with the concurrence of the Navy Department, declared that it should henceforth be called Pillsbury Sound, in honor of Rear Admiral John E. Pillsbury, late President of the National Geographic Society, to whose scientific research relating to the laws that govern the movements of the Gulf Stream it is a modest tribute.

Pillsbury Sound is about two miles long from east to west and a mile and a half wide from north to south. It varies in depth from 8 to 16 fathoms and all the main passages leading into it are deeper than the sound itself. In its midst lie two small barren rocks, about 20 feet in

height, known as the Two Brothers. Within its curves a mighty fleet may safely ride at anchor.

Not all the Virgin Islands are named after the saints. There is Tortola, the Isle of the Turtle Dove, and Gorda, the "Fat Virgin," and Anegada, the Drowned Island, because it contains a vast lagoon known as Flamingo Pond, one of the few places where this bird of such gorgeous plumage is to be found south of the Bahamas.

Anegada is skirted on its northern shores by a narrow band of coral, known as Horseshoe Reef, making the approach to the island one of the most dangerous along the whole Atlantic. Countless proud hulls have been crushed on its jagged edge. It was this island that put an end to the pirating of Prince Rupert of the Rhine, who left Ireland in 1648 to fight for the English king in the colonies, and that sheltered Sir Francis Drake in the bay named in his honor, when he was on the lookout for the galleons of Spain.



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BLACKBEARD'S CASTLE, ON THE CENTRAL HILL ABOVE CHARLOTTE AMALIE: ST. THOMAS

Though legend tells us that here the famous Blackbeard lay in security, ready to pounce upon any ship that ventured near the harbor, the fort was probably built by the government, as was "Bluebeard's Castle," shown on the opposite page.

TORTUGA, WHERE PIRATES MADE THEIR HOME

No place can claim a fuller measure of pirate lore than Tortuga, a small island located opposite Port de Paix, off the northern coast of Haiti. It is heavily wooded, rugged, and sparsely inhabited, and for those who are ignorant of its past there is nothing about it to arouse curiosity; but to those who know its history it is an enchanted isle, for it is alleged to contain more buried treasure than any other spot in the Antilles. For thirty years after the buccaneers were driven from St. Kitts it was such a stronghold for the "brethren of the sea" that even the mighty King of Spain, with all his ships and men, could not break it up.

Esquemeling, that delightful old pirate who turned into literature the doings of the sea wolves with whom he was associated and those about whom he naturally had heard so much, tells us that the Spanish named the island Tortuga because in shape it resembles a sea-tortoise,

called by them *tortuga de mar*, a reptile which was an important article of food for these early rovers of the sea and was plentiful on the island.

In its prime, when it was the headquarters of the buccaneers, this sink of the West Indies was spoken of as "the common refuge of all sort of wickedness and the seminary, as it were, of pirates and thieves," though it was admitted that the outlaws themselves lived together in orderly fashion, without bolts or bars on their doors.

The reason for the choice of Tortuga as a resort lay in the fact that its harbor was easily defended, and that it gave easy access to the Mona and Windward Passages, the usual routes followed by the ships of Spain in their voyages to and from Cartagena, Porto Bello, and Vera Cruz.

Here the freebooter had a home; on the beach he careened his ships and divided his pieces-of-eight, and in the town of Cayona he set up such Lares and Penates as he had, rested from his labors, and cursed or swaggered over his luck. In the later days of piracy it became the seat of operations of the French corsairs, the English repairing to Jamaica.

HOW PETER WON HIS PLACE IN THE PIRATES' "WHO'S WHO"

Perhaps no one has ever left his mark so indelibly upon any place as did the French pirate, known as Peter the Great, upon Tortuga. Before the time when this celebrity by a single act won a kingly nickname, amassed a fortune, manufactured a halo for himself, became a shining example to his fellow-men, and then wisely retired from business, the little island was a self-respecting community of humble, honest, and peaceful planters.

The exploit which placed Peter in the "Who's Who" of piracy was his encounter with the vice-admiral of the Spanish fleet. The engagement occurred while the latter was sailing majestically through the Bahama Channel. Peter overhauled the Spaniard, clambered with his men over her sides, scuttled his own boat to make him and his horde fight with more devil-may-care recklessness, and mastered the prize.

Peter then took his gorgeous new vessel home to France, where he lived in respectability for the rest of his days. But the effect of his prosperity on the inhabitants of Tortuga was instantaneous. There was a mad scramble for boats, and they thenceforth became scavengers of the sea.

HOW THE BUCCANEERS GOT THEIR NAME

It was in Tortuga that the men who thought it their right to prey upon the commerce of Spain acquired the name of buccaneers. One of the chief reasons for the choice of Tortuga as a pirate colony was its nearness to Haiti and the *bucans*, where they could obtain their meat supply. When Santo Domingo was settled by the Spaniards they found that it produced no cattle, the only quadrupeds of any size being wild pigs; so black cattle were imported. The herd increased with a rapidity almost beyond belief and ran wild over the island.

The men of Haiti and Santo Domingo hunted these cattle for food, shooting them with muskets four and a half feet long. The meat was cut into strips and hung on frames over slow fires to smoke.

The Indians, who taught the settlers the process, called both the place where the curing was done and the dried meat itself *bucan*, and as the cattle-hunters usually presented a bloody and forbidding appearance, they were termed buccaneers.

The exposed geographic position of the island of Haiti, which gives one the impression, from any direction it is approached, that here an enormous and heterogeneous mass of mountains was cast into the sea, made it a convenient stopping place and battleground for almost everything that drifted across the seas. Columbus found it; Ponce de Leon became lieutenant to its governor, acquired fame on it for himself as a successful slayer of Indians, and used it as a base of operations for explorations in Porto Rico and elsewhere. Seldom has it seen days of peace.

In the latter half of the seventeenth century Jamaica was the stronghold of the English buccaneers. Morgan, the greatest and most sagacious of the pirates, planned most of his expeditions in Port Royal, which had the reputation of being the richest and wickedest spot on the earth. And proud the city was of its notoriety. Defiant, flamboyant, and un-

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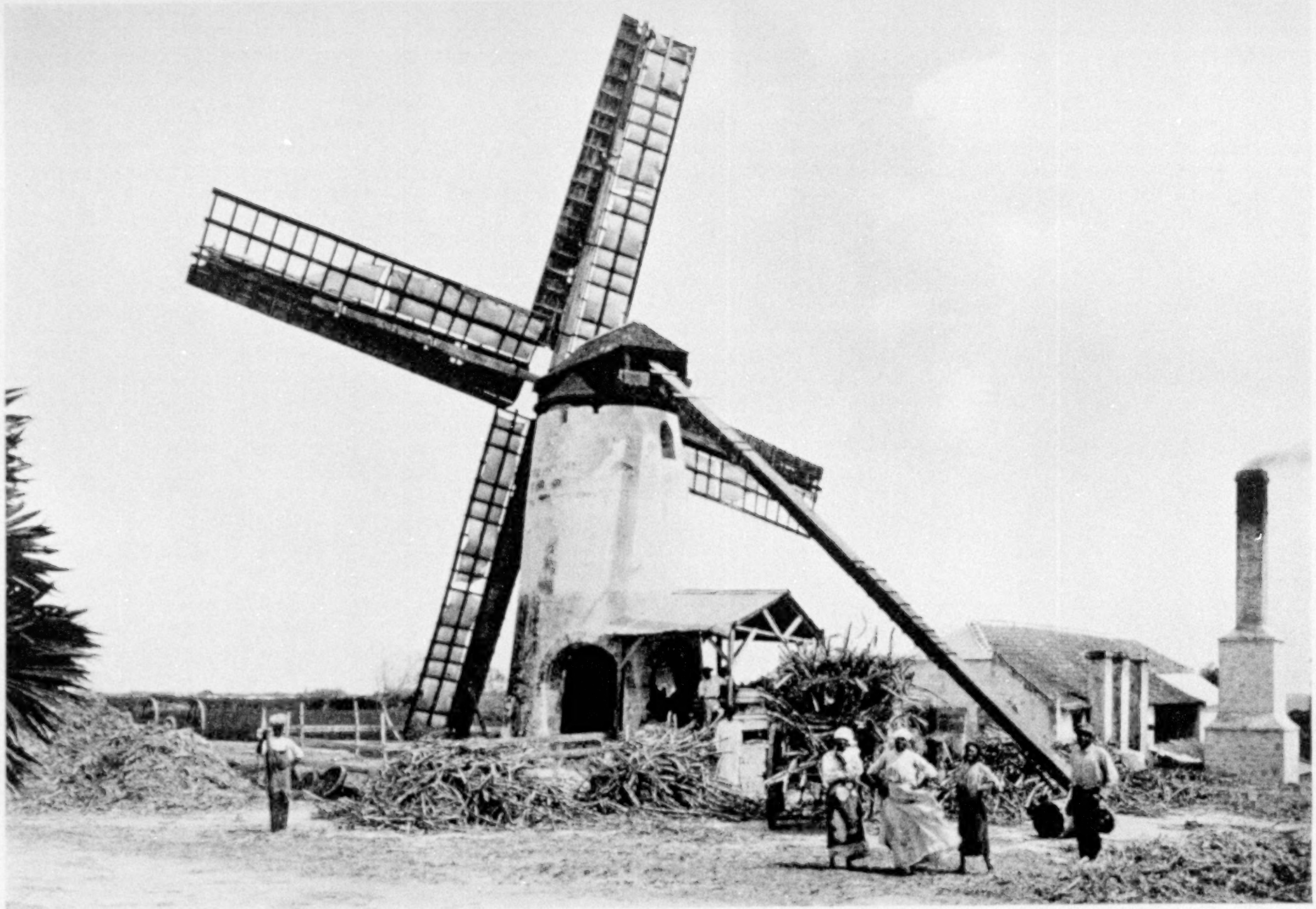
AN AVENUE OF ROYAL PALMS AT BRIDGETOWN: BARBADOS

So dense is the population of this 166 square miles of the British Empire set down in the West Indies that it is hard to tell where one town ends and another begins. The little island, due to its delightful climate, has long been known as a health resort.



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ONE OF THE MANY WINDMILLS ON THE SUGAR PLANTATIONS OF BARBADOS

Barbados has well earned the sobriquet of "Little England," by its loyalty and its persistence in maintaining the traditions of the mother country. A "Badian born and bred" seldom leaves the "tight little, right little, island." The cultivation of sugar-cane was introduced on the island about the middle of the 17th century and, owing to the cheapness of labor and the fertility of the soil, proved highly profitable from the beginning.

XUM

Photograph by Herbert B. Turner

LOOKING SEAWARD FROM A POINT NEAR THE VILLAGE OF BATHSHEBA: BARBADOS

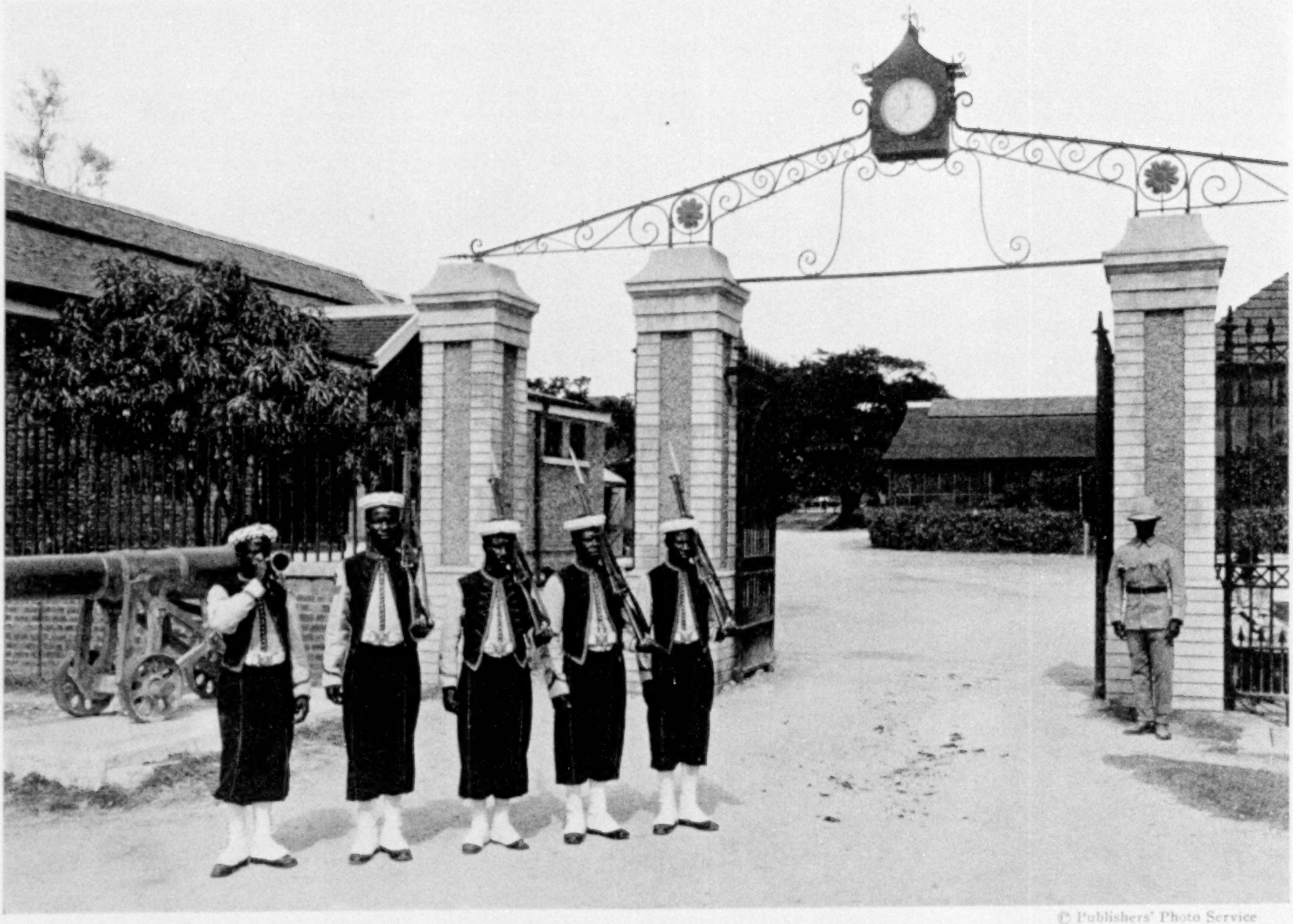
Bathsheba is considered the spot *par excellence* for healthful sea breezes in Barbados. The shore-line, which at this point curves about a beautiful bay, is noted for its mushroom- and haystack-shaped rocks.

Photograph by Herbert B. Turner

THE BUSY HARBOR AT BRIDGETOWN : BARBADOS

Bridgetown is one of the busiest ports of the British West Indies, its export and import trade each amounting to more than fifteen million dollars annually, the major portion being with the United States and Canada.

MUM



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NOT A MUSICAL COMEDY CHORUS, BUT A GUARD IN FRONT OF THE MILITARY BARRACKS AT KINGSTON, JAMAICA

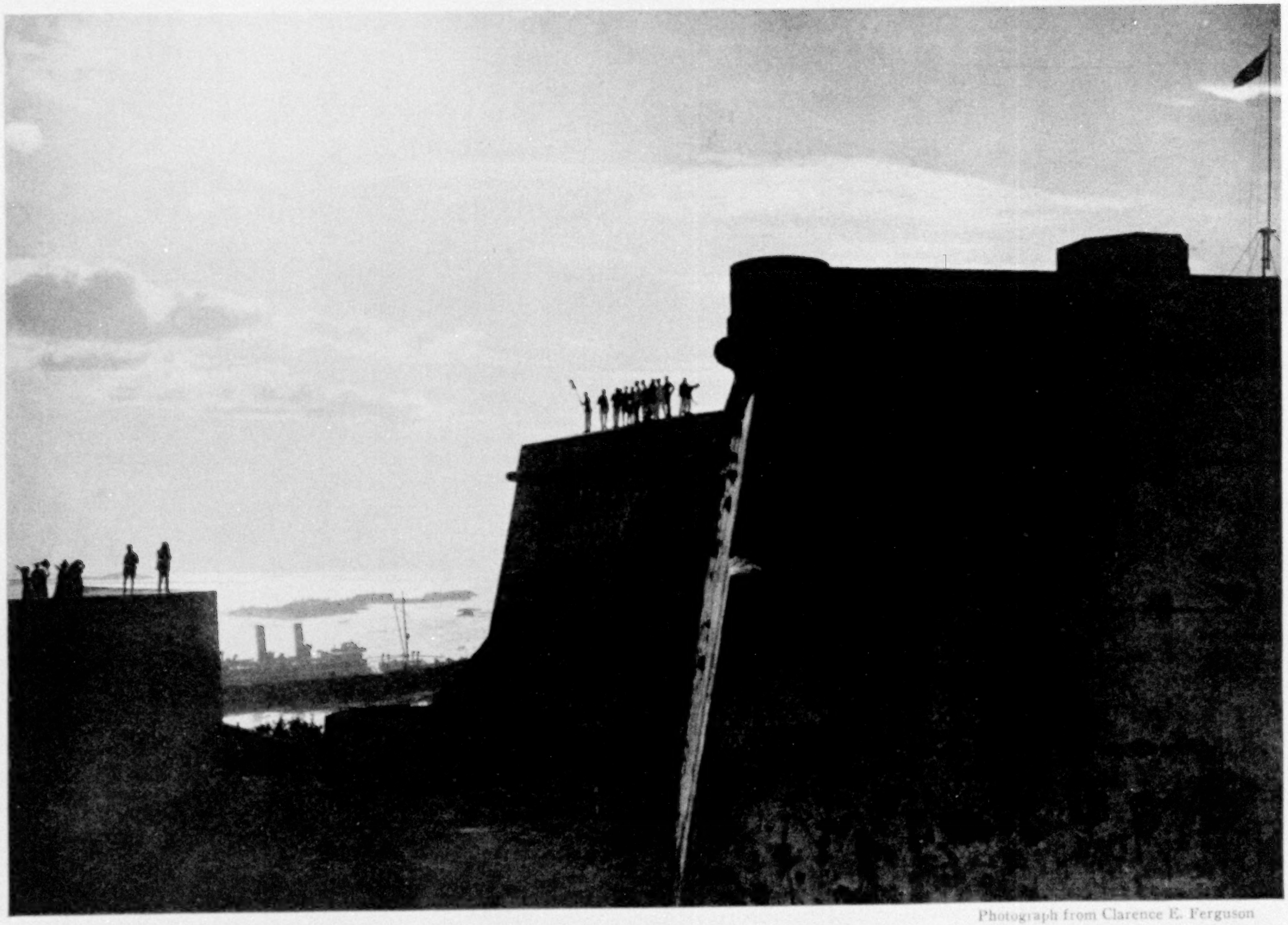
From the barracks, which are at an elevation of 3,900 feet, one can see more than a hundred miles of Jamaica's coast-line, as well as the city of Kingston and its harbor, Port Royal, and the Palisadoes, where Sir Henry Morgan, reformed pirate, lies buried.

© Publishers' Photo Service

A PANORAMA OF THE HARBOR OF CHARLOTTE AMALIE, CHIEF SEAPORT OF THE VIRGIN ISLANDS

Nearly all the inhabitants of the island of St. Thomas are clustered in the town of Charlotte Amalie, which is built on the four hills encircling the metropolis of the most recently acquired insular possessions of the United States.

XUM



Photograph from Clarence E. Ferguson

ONE OF THE FIRST FORTIFICATIONS IN THE NEW WORLD: MORRO CASTLE, SAN JUAN, PORTO RICO

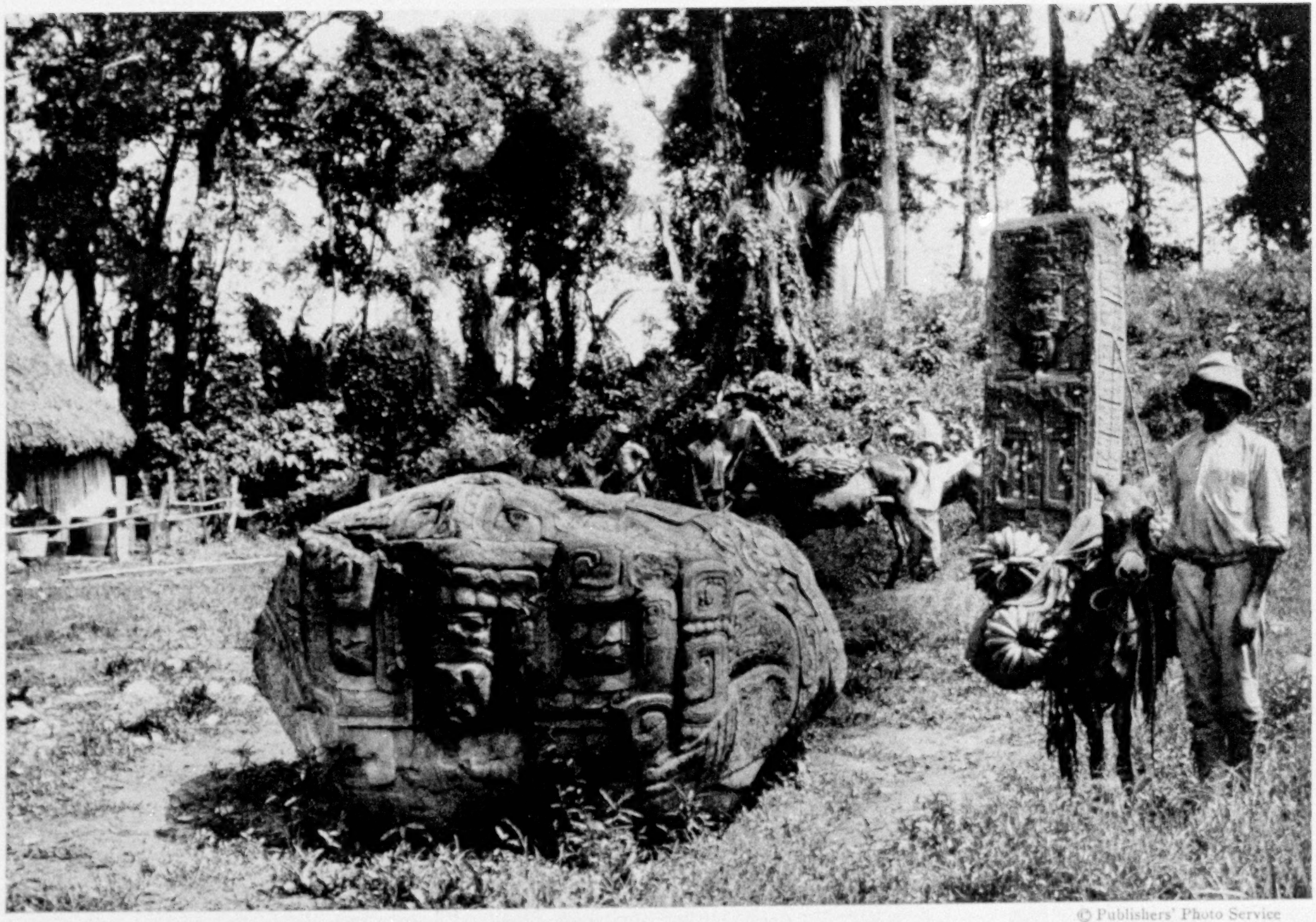
San Juan is today one of the most perfect specimens of the walled town, with battlements, a moat, and portcullis. Morro Castle, which was completed in 1584, though it was begun much earlier, has within its walls a chapel, warehouses, officers' quarters, barracks, a bakery, and dungeons under the sea.

Photograph from O. Gaylord Marsh

THE CASTILLO OR PRINCIPAL TEMPLE AT THE RUINS OF CHICHEN ITZA, YUCATAN, MEXICO

This splendid temple surmounts a pyramid 85 feet high, composed of 9 paneled terraces or platforms. Stairways lead up all four of the sides, but only that on the front, or north side, has serpent balustrades. These are made in the likeness of the feathered serpent, Kukulcan, the Culture Hero of the city. The head is at the bottom of the stairway, the body forms the balustrade, and the tail, represented with rattles, is the newel-post on the summit above. The ceremonies to the rain deities, which culminated so tragically and so gruesomely at the brink of the Cenote of Sacrifice (see page 114), were probably begun in this temple by the priests incensing the maidens chosen for sacrifice.

XUM



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TWO OF THE FOURTEEN GREAT STONE MONUMENTS AT THE RUINS OF QUIRIGUA, GUATEMALA

The ruins of Quirigua are located on a banana plantation in the Department of Izabal, Guatemala. This city flourished from 472 to 551 A. D. and was probably founded as a colony from Copan, the great southern Maya metropolis, 35 miles to the southeast. The two monuments shown above are Zoömorph B (left foreground) and Stela A (right background). They were erected to commemorate the ends of successive 5-year periods, the latter dating from 516 A. D. and the former from 521 A. D.

© Publishers' Photo Service

THE SHADY LANE LEADING TO ST. JAMES POLICE BARRACKS, PORT OF SPAIN : TRINIDAD

The trees in Trinidad are giants of great luxuriance, variety, and beauty, many of them of primeval growth. They furnish some of the principal dyes and cabinet woods known to commerce.

XUM

© Publishers' Photo Service

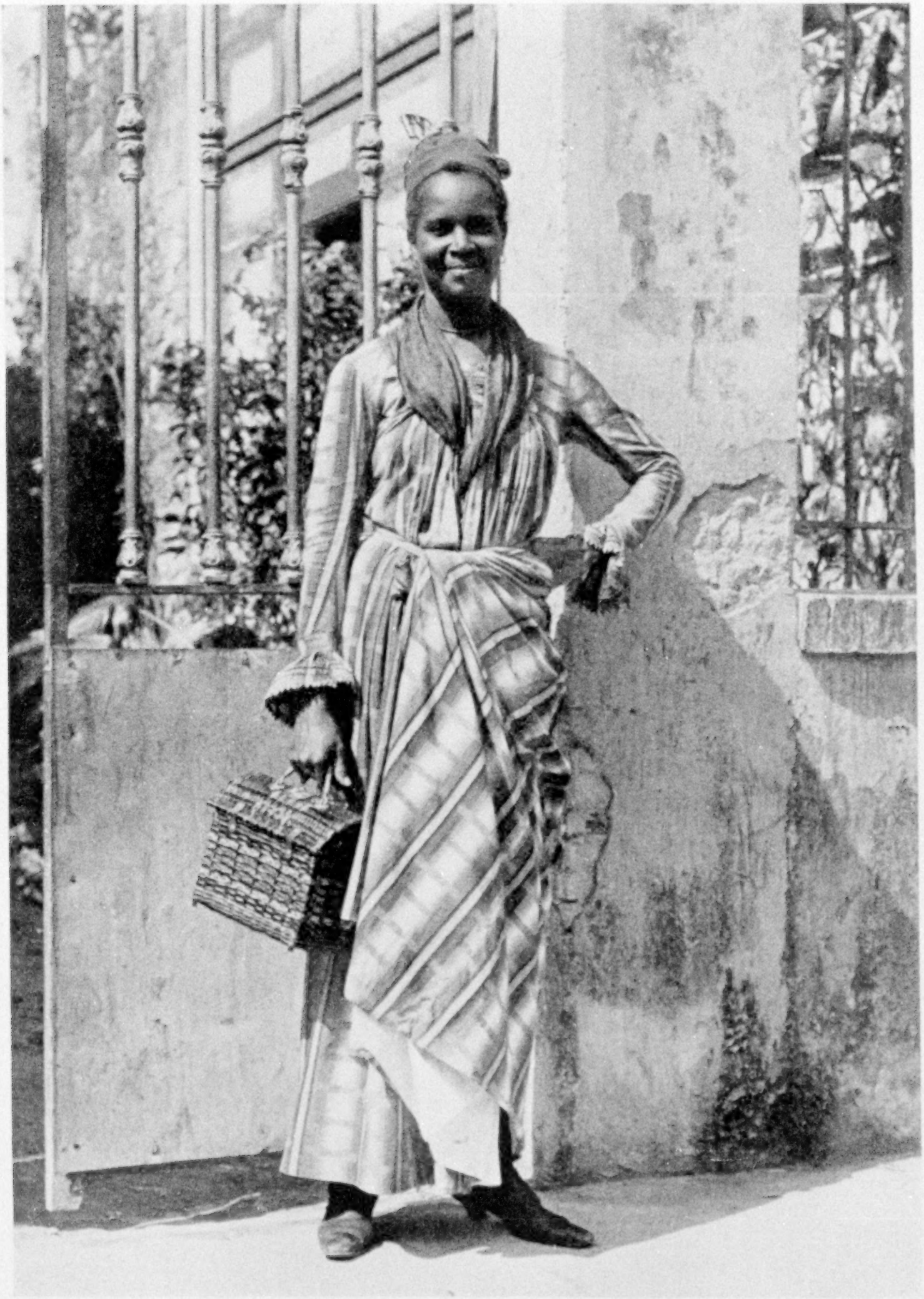
OPENING COCOA PODS; TRINIDAD

The men usually slash open the pods with large knives and scoop out the contents—a sticky white pulp containing about forty beans arranged in rows. The women and boys with their hands break the beans out of the pulp.

© Publishers' Photo Service

A BAMBOO TREE ALONG THE ROADSIDE IN TRINIDAD

Trinidad presents a fascinating field for the naturalist. One historian says of it: "We have lakes of pitch, streams of tar, oysters growing on trees, an animal resembling a fish that produces its young alive, crabs that climb and feed in fruit trees, another fish that entertains us with a concert, and one kind that is clad in a complete suit of armor."



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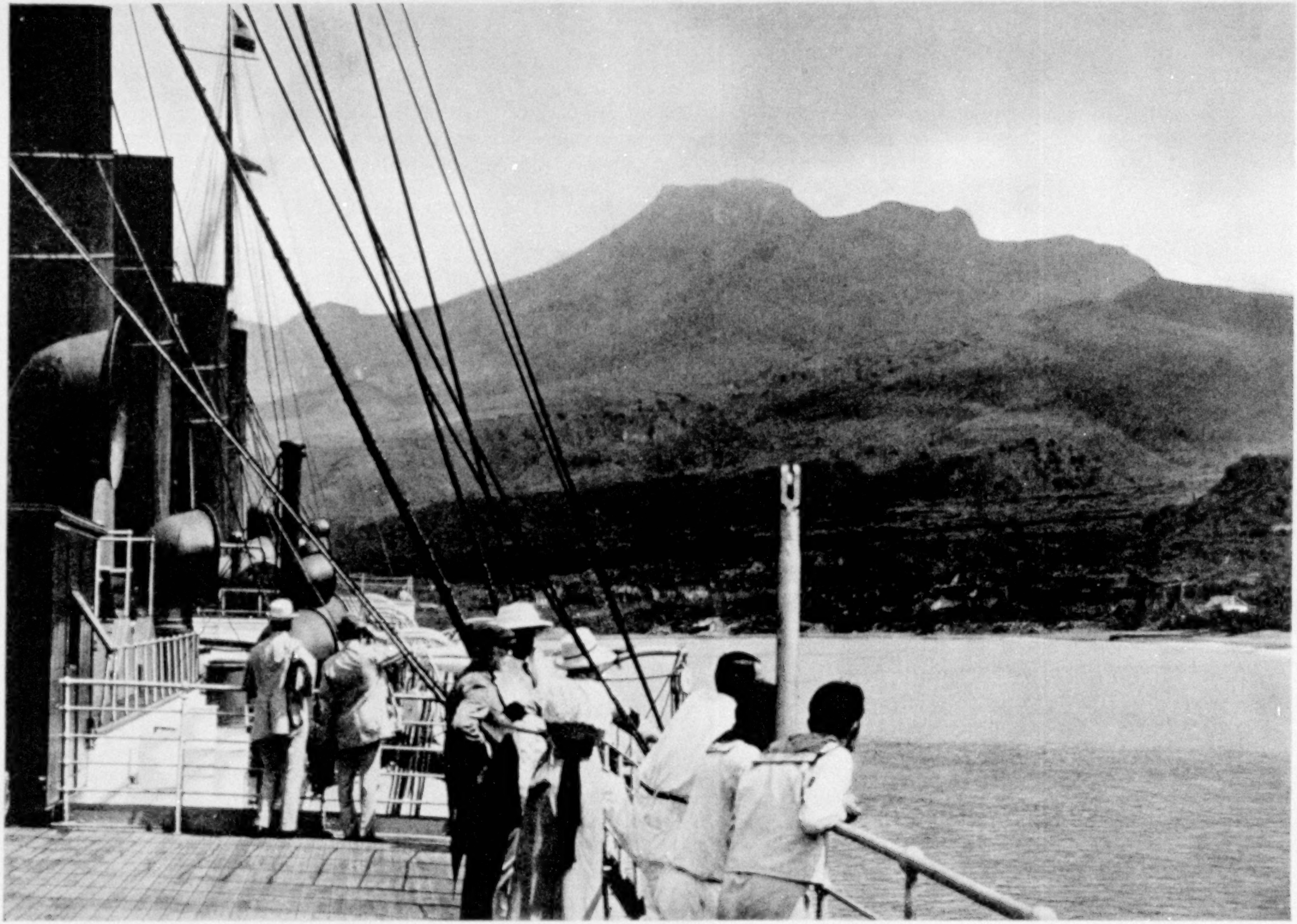
A STATUESQUE VENUS OF MARTINIQUE

The race of Martinique—a mixture of Carib Indian, French, and Negro—varying through all the shades of yellow and brown, is a remarkable one. The men are finely formed and lithe in their movements and the women exceedingly comely.



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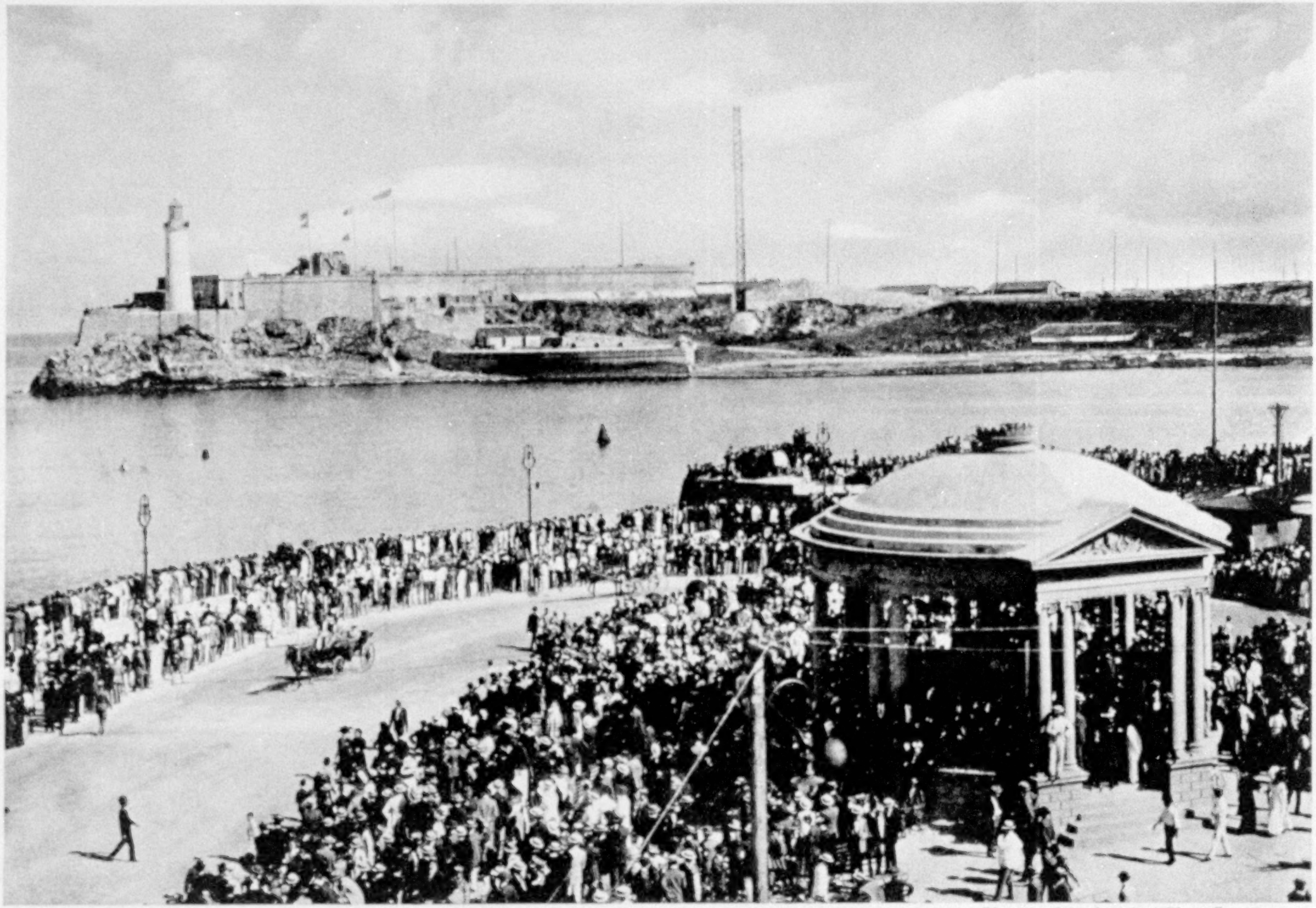
THE EVIL GENIUS OF MARTINIQUE: MONT PELÉE

Gloomy and sinister, the mountain towers above Fort de France, the capital of the island and the chief city since the complete destruction of St. Pierre by volcanic eruption on May 8, 1902 (see "The National Geographic Society's Expedition to Martinique and St. Vincent," in THE GEOGRAPHIC for June, 1902).

© Publishers' Photo Service

THE STATUE OF MARTINIQUE'S MOST FAMOUS WOMAN, NAPOLEON'S JOSEPHINE

Always the proud Empress, but in certain lights a bit wistful, she stands in Fort de France, facing Trois Ilets, where her youthful days were spent. The estate on which she lived, together with the church where she was baptized, are today the principal points of interest in connection with the life of this famous woman in Martinique.



Photograph by American Photo Company

MORRO CASTLE AND THE MOUTH OF HAVANA HARBOR, FROM THE BANDSTAND AT THE FOOT OF THE PRADO

There are few such picturesque harbor entrances in the world as that of Havana. The tongue of land on which Morro Castle is situated is extremely narrow, and whether the castle is viewed from the Prado, the Malecón, or from the sea, it is a picture at once grim and beautiful. The Prado is a broad avenue with beautiful center parking and lined by splendid residences and aristocratic clubs, interspersed with cheap fruit stands and small stores. The Malecón is the magnificent seawall driveway built during the American occupation.

abashed, it greeted the chiefs who lent riotous color to its life, emptied gold into its coffers, and tinged its nights with drunkenness and depravity.

EARTHQUAKE CASTS PORT ROYAL PIRATES INTO THE SEA

In those days Port Royal had a high wall about it and wide quays, whereon its habitués emptied their pieces-of-eight. Then, as if Providence were outraged by its utter disregard of moral laws, an earthquake, on June 7, 1692, shook Jamaica to its foundations and tumbled this den of iniquity, with scores of the pirates, into the sea. When the water is calm the coral-encrusted ruins of the old town may be seen beneath the water, even today, and the natives still regale the visitor with stories of phantom ships that are trying to make the port.

One interesting relic remains, however, in Fort Charles, a stiff old veteran of sun-faded bricks. Some of the officers' quarters and a paved court, so white that it dazzles, are still standing. Flower gardens now encircle its walls; its gun embrasures are hidden by bushes; the birds haunt its crannies, and the lizards crawl lazily over its parapets. Horatio Nelson was stationed at the fort in 1779, when he was twenty-one years of age, and the paved platform which was known affectionately as his "quarter-deck" may still be seen.

The town now standing on the old site is respectable, faded, and disconsolate. On the fences and bushes, in melancholy ugliness, the commonplace inhabitants dry the fishing nets by means of which they eke out their existence.

The pirates, with these two bases, Tortuga and Port Royal, for operations, took toll of all the islands and lands along the Caribbean.

Across the magnificent harbor from Port Royal lies Kingston, the capital of Jamaica and one of the most important ports in the West Indies. Its foundations were laid by Port Royal survivors.

Though only 2 per cent of Kingston's 50,000 people are white, no small body of citizens of any city has shown more courage, energy, and determination during the hurricanes and earthquakes which have time and again literally destroyed its very foundations. Hardly had its charred ruins cooled after the violent earthquake and fire in 1907 before the survivors were busy building, between the palm-fringed shore and the blue hills beyond, a clean, regularly laid-out town to take the place of the one which Nature had just destroyed (see pp. 161, 180-183).

Havana, which rose to importance as a convenient port of call for ships passing through the Florida Straits bound for Mexico, was frequenlty attacked and looted. Santiago's harbor, that magnificent "bottle" with a neck of less than 600 feet, sheltered pirate ships while their owners tortured the city's inhabitants and extorted enormous sums from them. Baracoa, Cienfuegos, and Trinidad, the last named one of the earliest fortified cities in the New World, were the scenes of desperate combats.

Just 23 years after its discovery, pirates began to harass Porto Rico, where Ponce de Leon, impressed by its rugged scenic beauty, had built at San Juan his Casa Blanca, which, together with the old cathedral in which his bones are buried, may be seen today. French privateers shortly afterward sacked the town of San German, and the Carib Indians ate the governor (see illustration, page 153).

Though American rule has placed its indelible stamp upon Porto Rico, the pretty city of San Juan is still Spanish in appearance. The low, flat-roofed houses, prodigal of sun-shuttered balconies, and lazy courtyards filled with shifting shadows, are packed together within its great black wall. Much-painted churches and dazzling government buildings border streets where blasé oxen and dust-covered mules jostle the electric cars, and over it all there broods a leisurely atmosphere (see illustration, page 163).

There are some 340 miles of railway and 1,100 miles of excellent roadway in Porto Rico, which has about three times the area of Rhode Island.

THE WEALTH OF THE NEW WORLD WAS SHIPPED FROM CARTAGENA

The destination of most of the ships which sailed from Spain to America was Cartagena, a town on the northern coast of Colombia. Its massive stone walls survive to speak of their strength in the early days. The wealth of the western coast of South America was gathered

and small stores. The Malecon is the magnificent seawall driveway built during the American occupation.

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AMERICAN TOURISTS LANDING AT ST. THOMAS: VIRGIN ISLANDS

On account of the natural features of this island, which if fortified would render it practically impregnable, it has been aptly called the Gibraltar of America.

XUM

Photograph by Herbert Turner

A BIT OF BARBADOS BEACH FRINGED WITH PALM AND FOAMING SURF

Such a shore-line the buccaneers sighted on practically all the coasts skirting the Caribbean from southern Florida to Trinidad, off the northeastern coast of Venezuela. Animal-Flower Cave, a remarkable cavern, has been hollowed out by the waves driven by the trade winds, which blow along the northern shores of the island.

Photograph by Herbert Turner

A LONG TRAIL A-WINDING THROUGH THE ISLAND OF BARBADOS

There are 470 miles of excellent roadway traversing this island. George Washington visited Barbados in November, 1751, upon his only voyage into a "foreign" country.

first at Panama, then hauled by mules across the Isthmus and deposited at Porto Bello, near the mouth of the Cascajal River, until it could be shipped to Cartagena; thence it was taken out, through the Caribbean Sea, across to the Azores and home.

When the Spanish fleet, usually consisting of from five to eight war-vessels, several smaller boats, and numbers of merchantmen, put in its appearance at Cartagena, about two months after leaving Cadiz, word was immediately forwarded to Porto Bello, then over the Isthmus, and down the Pacific coast to the viceroy at Lima.

The governor of Panama also passed the word along to the inhabitants of Granada, which lay farther north, in the Central American region, and to the merchants along the Guatemalan and Nicaraguan coasts who might be interested.

Soon there was gathered in Old Panama the riches of the Incas—silver bullion, silver plate, and precious stones—gold from the mines at Cana, the richest in America at that time, and pearls from the Pearl Islands in the Gulf of Panama, just to the west of the Gulf of San Miguel. Into this body of water Vasco Nuñez de Balboa waded shortly after he had seen the mighty Pacific from the top of Mount Pirre, and, in the name of his sovereign, Ferdinand of Spain, claimed the South Sea and all the lands bordering it, from Pole to Pole, until the Day of Judgment.

Despite the fact that Porto Bello has one of the best harbors on the Caribbean west of Cartagena, it plays an inconspicuous rôle today, due in some measure to the fact that it is exceedingly unhealthful. This condition, however, though hundreds of men succumbed yearly, did not serve to diminish its importance in early days.

The ancient city, the real entrepôt to the Isthmus, was situated at the head of the horseshoe-shaped Porto Bello Bay. In its prime it is said to have boasted 130 houses,

a hospital, governor's house, churches and convents. Merchants, soldiers, and seamen crowded into the huts occupied by mulattoes until houses could be built for them; but so far had the desire for economic justice developed among them that prices were fixed for most commodities and lists published beforehand, to insure the inhabitants against profiteering.

The old town was alive with business men when the famous Porto Bello fairs were in full swing, and merchants spent as much as a thousand crowns for a small shop to house their commodities during the forty-day period.

DESOLATE OLD PANAMA ONCE CHIEF CITY OF THE AMERICAS

But Old Panama, founded in 1518, was the metropolis of the Isthmus then as New Panama is today. It was probably the richest place in all America, since it was the market for the whole of the west coast, as well as for the spices and silks of the Orient, and it kept in touch with the towns along the east coast through the Chagres River.

Though the site of Spain's great power in America is today an utter ruin, with only a few evidences of former habitation, the tower of the old Cathedral of San Geronimo, standing out above the jungle, may be seen from the walls of the new city. Built on a rectangular point of land, where it was naturally protected on three sides by rocky bluffs and on the land side by a morass, it was able to hold its own against all enemy expeditions until it was destroyed, in 1671, by Henry Morgan. Panama City was founded a few miles farther west (see page 187).

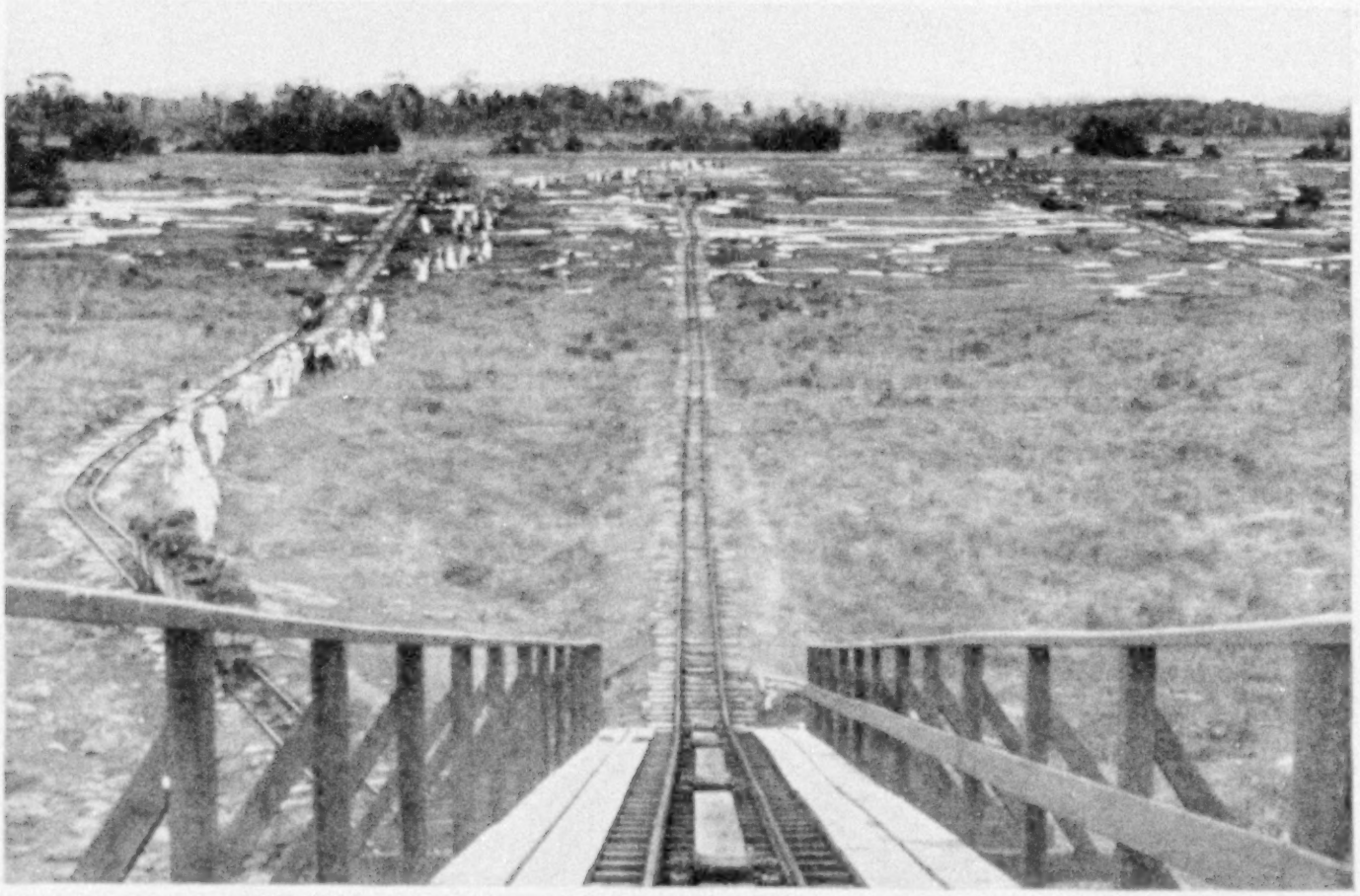
Where desolate ruins are now, once there flourished a city reputed to have had a population of 30,000. Its two hundred houses of European elegance and five thousand of the common kind, its mint, its hospital, its hundreds of warehouses, its cathedral, its eight convents and the king's stable, made it the equal or the superior of anything to be found on the two continents. Portions of the old Gold Road, along which the tiny bells of the heavily laden mules used to tinkle, can still be followed for miles toward Porto Bello, though in many places it becomes an almost unrecognizable trail through the forest. (See map supplement.) It was in this arena that Morgan played so staggering a part (see pages 184-186).

No story is complete without the development of its villain, and such a part in the history of Panama is the one

© Publishers' Photo Service

MODERN "PIRATES" OF BARBADOS WAITING FOR THE PENNIES OF THE PASSENGERS ON A LINER

The Barbadian negro is noted for his large, round head, his pleasant features, and his open countenance. He is polite and well-mannered, in contrast to his less genial Jamaican brother.



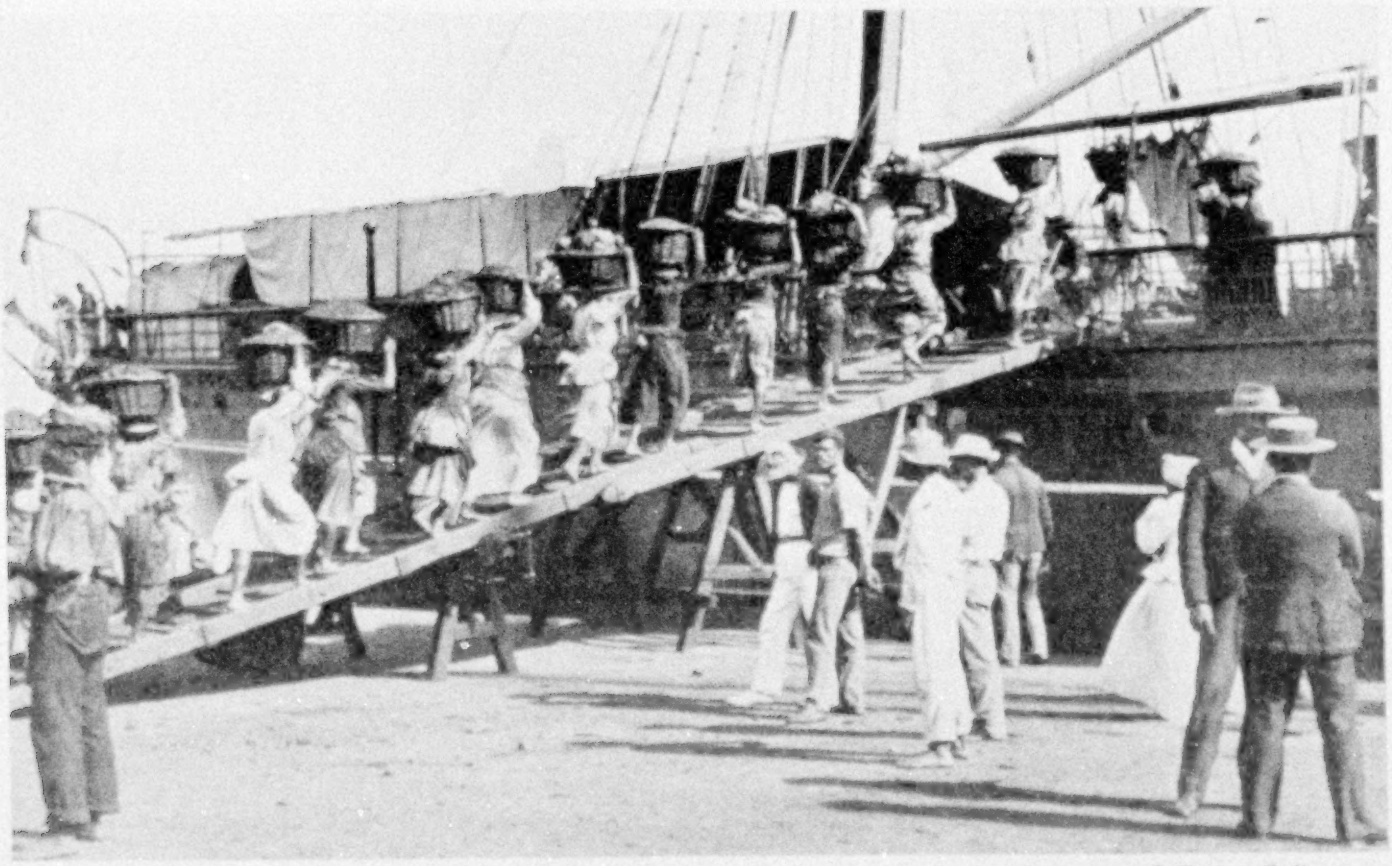
THE GREATEST ASPHALT PRODUCER IN THE WORLD—PITCH LAKE, TRINIDAD

The pirates often sought the shores of Trinidad to calk their boats with the pitch which was here so plentiful. Along Caribbean coasts it is reported that formerly quantities of the substance melted in the sun and then congealed in great heaps, resembling small islands.

© Publishers' Photo Service

A CARIBBEAN CONTRIBUTION TO THE STREETS AND HIGHWAYS OF THE UNITED STATES

The remarkable Pitch Lake of Trinidad furnishes a million dollars in revenue for its people each year. Columbus noted "that abundance of stone pitch that all the ships of the world might be therewith laden from thence." He found it excellent in trimming his vessels.



© Ewing Galloway

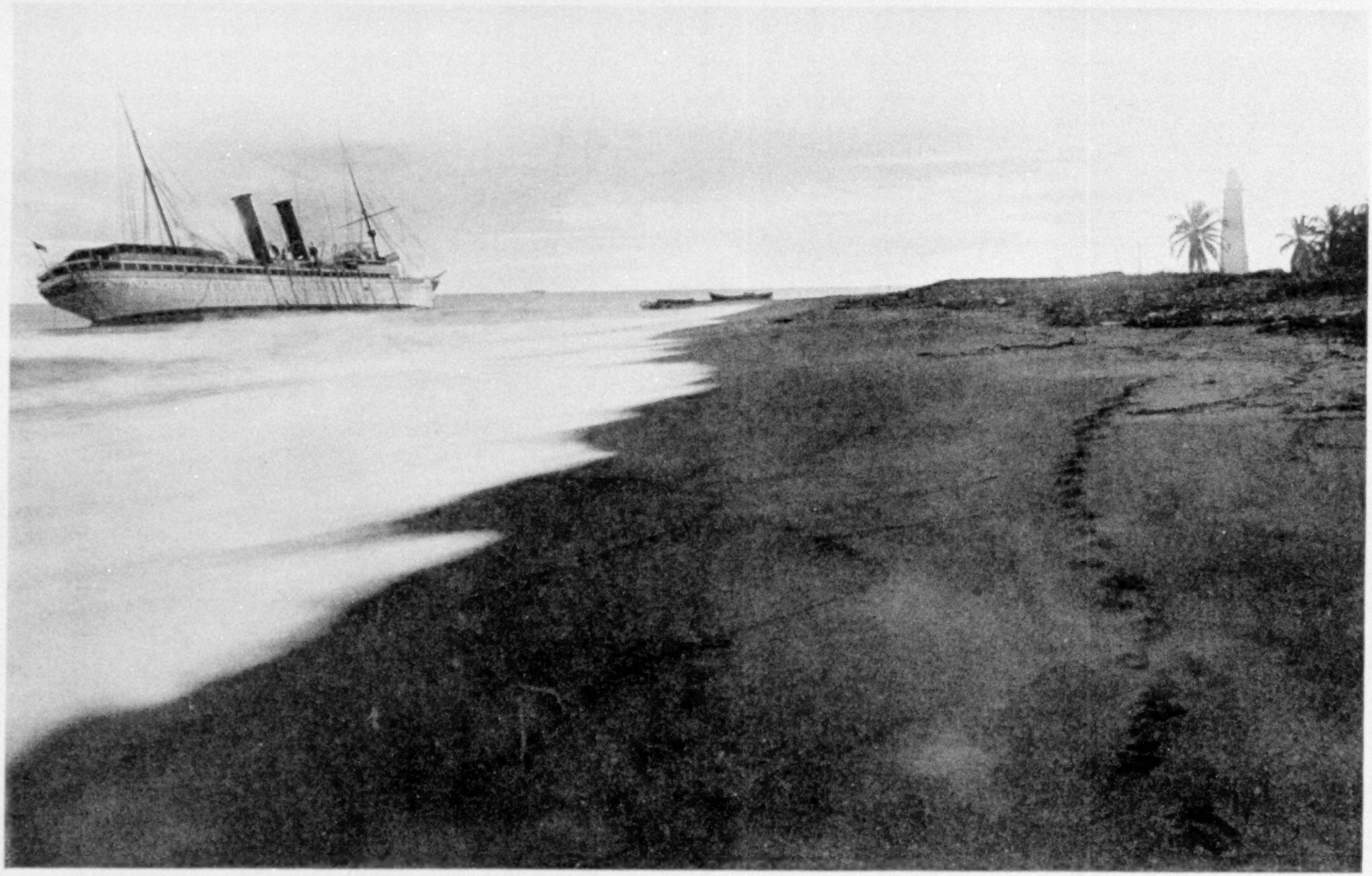
BRAINLESS HEADWORK AT ST. LUCIA: WINDWARD ISLANDS

It is customary in many of the islands of the West Indies for women, each carrying from 75 to 90 pounds of coal on her head at one time, to fill the bunkers of the vessels which stop at their ports.

Photograph by Herbert Turner

THE TOWN SQUARE IN BASSETERRE, THE CAPITAL OF ST. KITTS

The clock-tower in the center of the square was erected to the memory of the Hon. T. B. Berkeley, a prominent citizen of the colony. The lower parts of the houses in St. Kitts are built of a grayish stone, the upper stories being of wood.

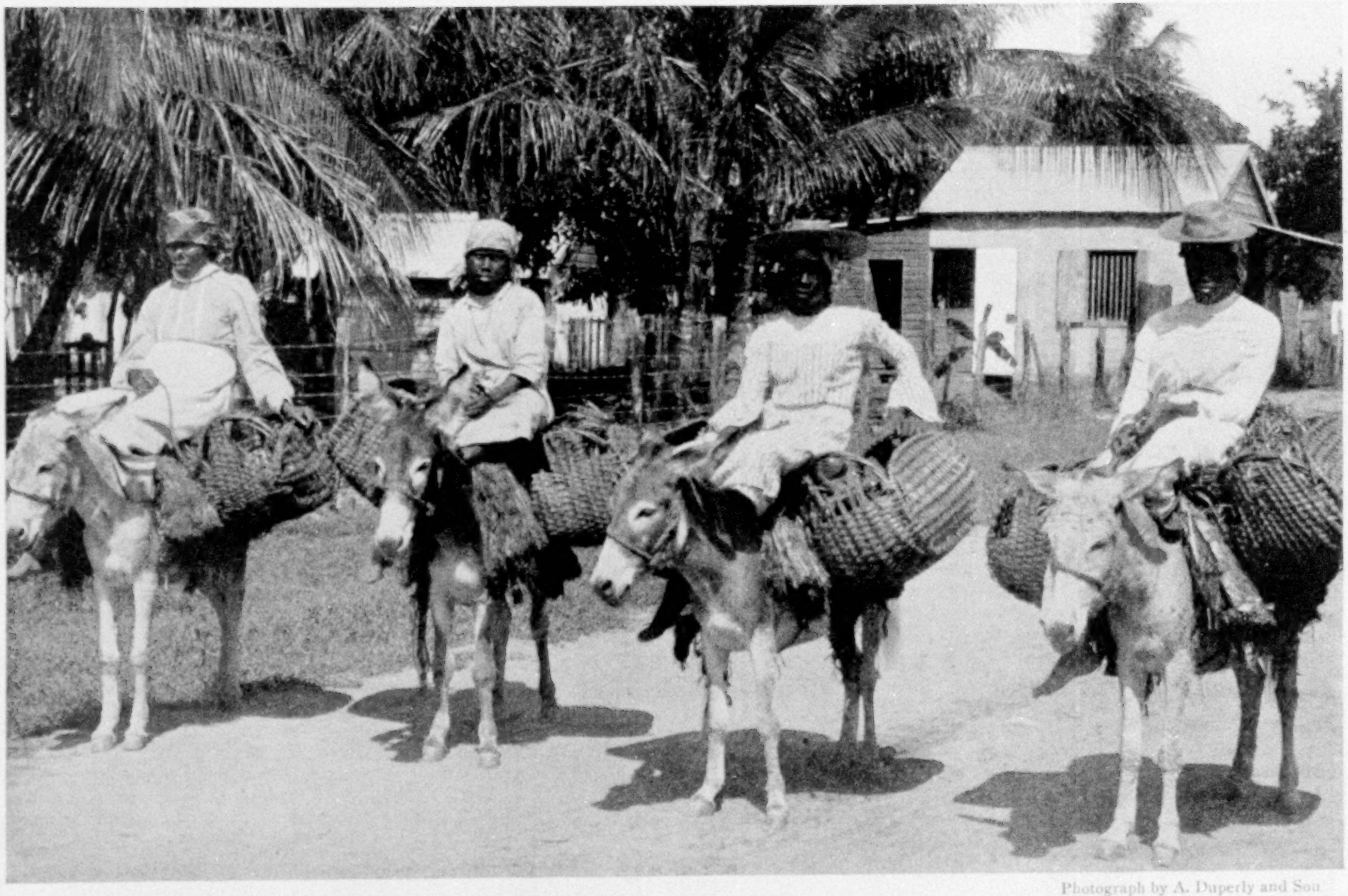


Photograph by Frederick Monsen

WRECK OF THE "VICTORIA LOUISE," NEAR KINGSTON: JAMAICA

In olden days into this very harbor at Kingston, which is ten miles long and two miles broad, the pirates' pinnaces poked their lean noses and rested in peace from their fighting. Jutting out from the mainland, just as the harbor is approached, is Gallows Point, where it is said the last of the pirates who haunted Cuba and Jamaica were executed.

XUM



Photograph by A. Duperly and Son

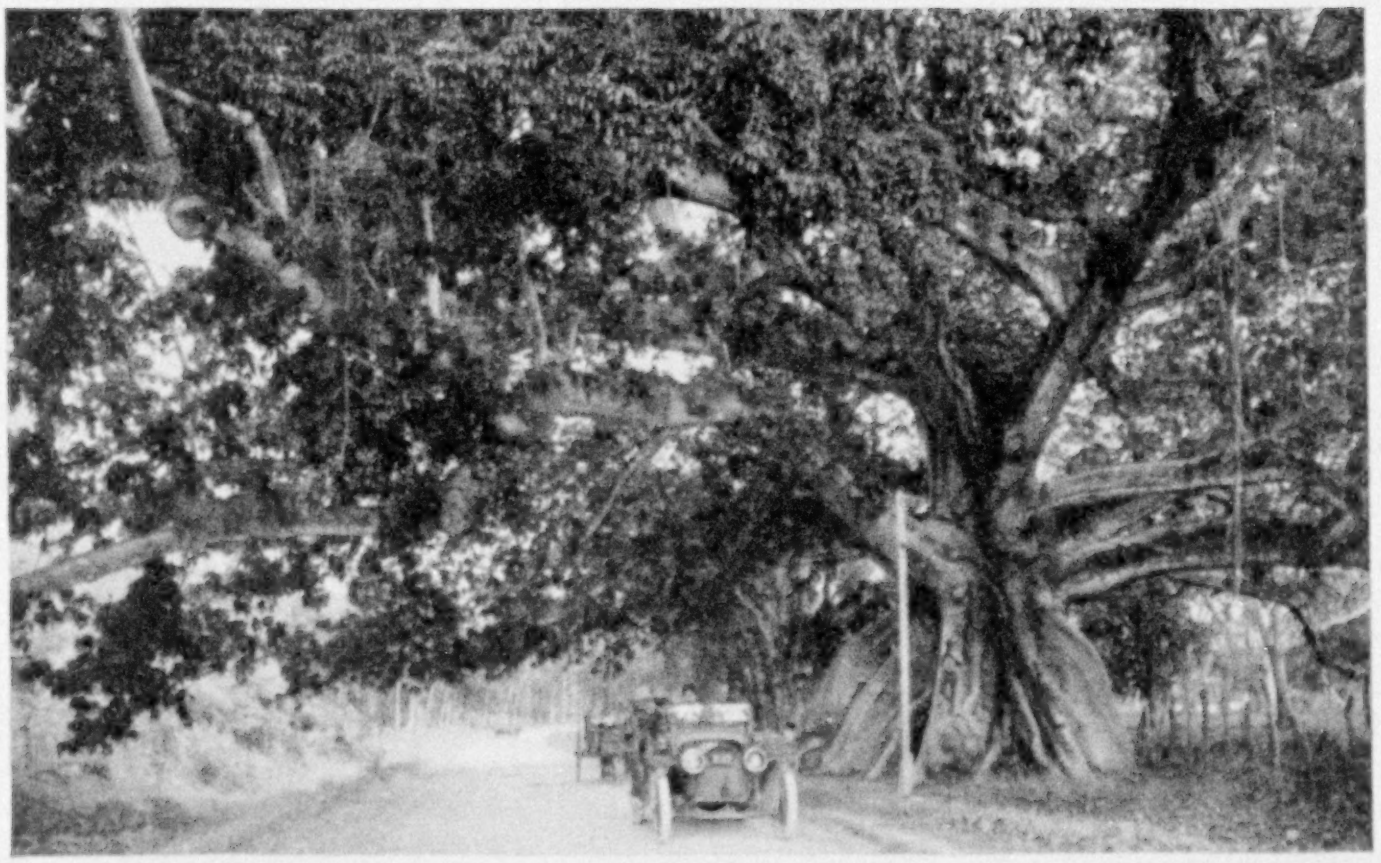
TRAVELING A LA MODE IN JAMAICA

The name Jamaica is derived from a native word which means the "Island of Fountains." An English fleet conquered its three thousand Spaniards and natives in 1665, and since that time it has been a part of the British Empire. Sir Henry Morgan was its governor after he renounced the profession of piracy (see text, page 187).

Photograph by A. Duperly and Son

THREE TYPES OF BURDEN-BEARERS IN JAMAICA

The story of the natives of Jamaica is that of many of the other islands in the West Indies. The Indians dwindled away under Spanish rule and the African Negro was imported as a laborer, with the result that he is the predominant race in the island today.



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A SILK COTTON, OR CEIBA, TREE: JAMAICA

The native of Jamaica will not voluntarily cut or injure trees of this species, because they are believed to be inhabited by "duppies," or spirits. If compelled to fell a tree, he chants during the operation, "Me no cut you, massa; he cut you."

© Publishers' Photo Service

GOING TO MARKET IN JAMAICA

In the old days Jamaica rum, then the most important product of the island, furnished the inspiration for the buccaneers and boosted their courage (see text, page 156). Today the raising of fruit, sugar, and coffee are the principal industries. Jamaica's Blue Mountain coffee brings, perhaps, the highest price of any in the world.

played by the wily Sir Henry Morgan, whose cruelties and inhumanities are usually whitewashed because of the glamor of his achievements.

THE DRAMATIC STORY OF A KIDNAPPED YOUTH

This lad of Wales, born of good parentage, was kidnapped in Bristol and shipped to Barbados to be sold as a bondsman. When he had served his time he sailed for Jamaica, where he joined the buccaneers, and his ability as a leader was immediately recognized.

The old and distinguished pirate admiral, Mansvelt, chose Morgan as his vice-admiral, in which capacity he served until the former's death, which left him at the head of the profession. His popularity as a leader and his reputation for boldness made it easy for him to collect about him hundreds of men and a large squadron of vessels; and from this time until his retirement his exploits read like

© Underwood and Underwood

MOTHER'S LITTLE HELPERS SHELLING THE BEANS FOR DINNER IN A HUMBLE COLOMBIAN HOME

It is said that nowhere, not even in Japan, is more kindness shown to children than in the South American home. In fact, the child cult has a place of great importance in the social and civic life of Latin American nations.

the fascinating stories of some crafty magician who picks up gold and jewels from unsuspected places and whose machinations never fail.

In 1670, after a series of successes, he was able to collect more than 2,000 fighting men and 37 vessels at Tortuga by simply letting it be known that he intended invading some stronghold on the mainland. Provisions for the journey having been captured and taken on board, the vice-admirals and captains met to decide which of the three ports—Cartagena, Panama, or Vera Cruz—should be the objective.

By almost unanimous decision, Panama was chosen, as it was believed to be the richest. They set sail for Santa Catalina (Old Providence), off the coast of Costa Rica, the convict station for outlaws from Panama, in order to secure suitable guides for the journey. Having con-

Photograph by Russell Hastings Millward

LITTLE BOYS AND GIRLS MUST LEARN THEIR A, B, C'S IN BRITISH HONDURAS, TOO

The early settlers of British Honduras were woodsmen and cattle-hunters, and today this crown colony of Great Britain is still noted for its mahogany and logwood.

Photograph from United Fruit Company

THE BRIDGE CROSSED BY MORGAN ON HIS WAY TO SACK OLD PANAMA IN 1671

The visitor to the ruins often crosses over this archway, which every night whispers to the waters of the famed South Sea that ebb and flow beneath it of the days when mules carrying the wealth of an empire passed over it (see text, pages 176 and 177).

Photograph from Geo. R. King

THE "FLAT ARCH" AT THE ENTRANCE TO THE RUINED CHURCH OF SAN DOMINGO; PANAMA CITY

When the arch over the entrance to the church was being built by Dominican monks, it fell three times. Then, according to legend, one of the monks had a dream in which a plan for a new arch was revealed to him, and when the one now standing was erected according to his dream it stood firm. The unique feature is that it is almost flat.

quered by stratagem this island, with its nine fortresses, Morgan sent a body of men to take the castle at Chagres, which would leave the way to Panama clear.

The castle, which was one of the most nearly impregnable fortresses of its time, lay at the mouth of the Chagres River, a few miles southwest of Colon Harbor. This the pirates took, by a very remarkable accident, after fierce fighting and the failure of many assaults. Esquemeling tells us that one of the pirates, wounded by an arrow that pierced his body from side to side, coolly pulled out the weapon, wrapped the end of it with cotton, stuck it in his musket, and fired it back at the castle. The cotton was kindled by the powder and, falling upon a thatched roof within the castle, set that building and numerous others on fire. The conflagration finally reached the powder magazine, which exploded, causing such consternation among the Spaniards that the garrison surrendered.

After a long and tiresome march across the Isthmus, the pirates at last reached Panama, which had been warned by the fall of Chagres and was ready for their coming. After almost twelve hours of continuous fighting, the proud Spanish capital fell into the hands of the pirates, who reduced it to ashes after seizing all the wealth which the inhabitants had not been able to send out to sea in one of their galleons.

MORGAN HELPS TO SUPPRESS PIRACY

Morgan was evidently wily enough to appropriate most of the booty for his own uses, and, fearing for his safety because

© Publishers' Photo Service

RUINS OF THE CATHEDRAL OF SAN GERONIMO AT OLD PANAMA

This old tower constitutes practically all that the pirates under Sir Henry Morgan left of the city which was once the pride of Spain in America (see text, page 177).

of the dissatisfaction among his men, he slipped away in the night to Jamaica with only a small contingent of his fleet. The governor received him with open arms, probably not daring to do anything else. Later they were both called to England to give an account of their doings; but Morgan was able to ingratiate himself with the king, who knighted him and sent him back to Jamaica as lieutenant-governor of the island because of his "long experience with that colony."

It is said of the reformed pirate that he proved a good executive and was instrumental in curbing further piratical operations in the West Indies, and on the theory that "it takes a thief to catch a thief," perhaps the English king's appointment was a wise one.

At any rate, Morgan's rule in Jamaica marks the end of the heyday of piracy in the Western World, and thenceforth Caribbean lands, if not entering upon such an era of happiness as is distinguished by "no history," lost for a time the glamor of romance and adventure.

Photograph from Harriet Chalmers Adams

DRYING AND SACKING COFFEE ON A SALVADORIAN PLANTATION

Coffee, the leading agricultural crop, forms over three-fourths of the total exports of the country. Other products are sugar-cane, indigo, cacao (cocoa), rubber, balsam, tobacco, and rice.

VOLCANO-GIRDED SALVADOR

A Prosperous Central American State with the Densest Rural Population in the Western World

By Harriet Chalmers Adams

Author of "Kaleidoscopic La Paz," "Cuzco, America's Ancient Mecca," "In French Lorraine," "Rio de Janeiro, in the Land of Lure," etc., in the National Geographic Magazine

SANTA CLAUS is not the only myth. *Cayenne* pepper does not come from Cayenne. *Panama* hats come from Peru and Ecuador; *Peruvian* balsam comes from Salvador.

El Salvador, as the people themselves call their volcano-girded, forest-fringed country, lies on the west coast of Central America, a week's sail by coastwise steamer, north from Panama.

The only country between Canada and Colombia without an Atlantic as well as a Pacific seaboard, Salvador was, until recently, the smallest of the American republics; now, with Honduras and Guatemala, it forms the new Republic of Central America. It has the densest rural population on the mainland of the Americas, with 1,400,000 people occupying an area no larger than the State of New Jersey.

Coasting Central America, I wakened one morning to see, through my cabin window, a line of majestic peaks against a rose-tinged sky. In the foreground, its outline nearly lost among the higher purple mountains, rose the volcano Izalco. Even as I looked, a cloud of smoke shot from its summit, and down the shadowy slopes swept a river of flame with radiating tongues of fire.

Seafaring men called Izalco "The Lighthouse of Salvador." To the Salvadorians this active volcano was known formerly as "The Safety Valve." They believed that its daily eruption assured their deliverance from severe earthquake and devastating lava flow. Then came the fateful day when Izalco ceased erupting, followed by those terrible earthquakes which in part demolished the capital, while another, heretofore dormant, volcano in a densely populated district rocketed forth a living stream of fire, which completely destroyed towns and *fincas* (estates), and for miles around covered that season's coffee crop with a fine lava dust.

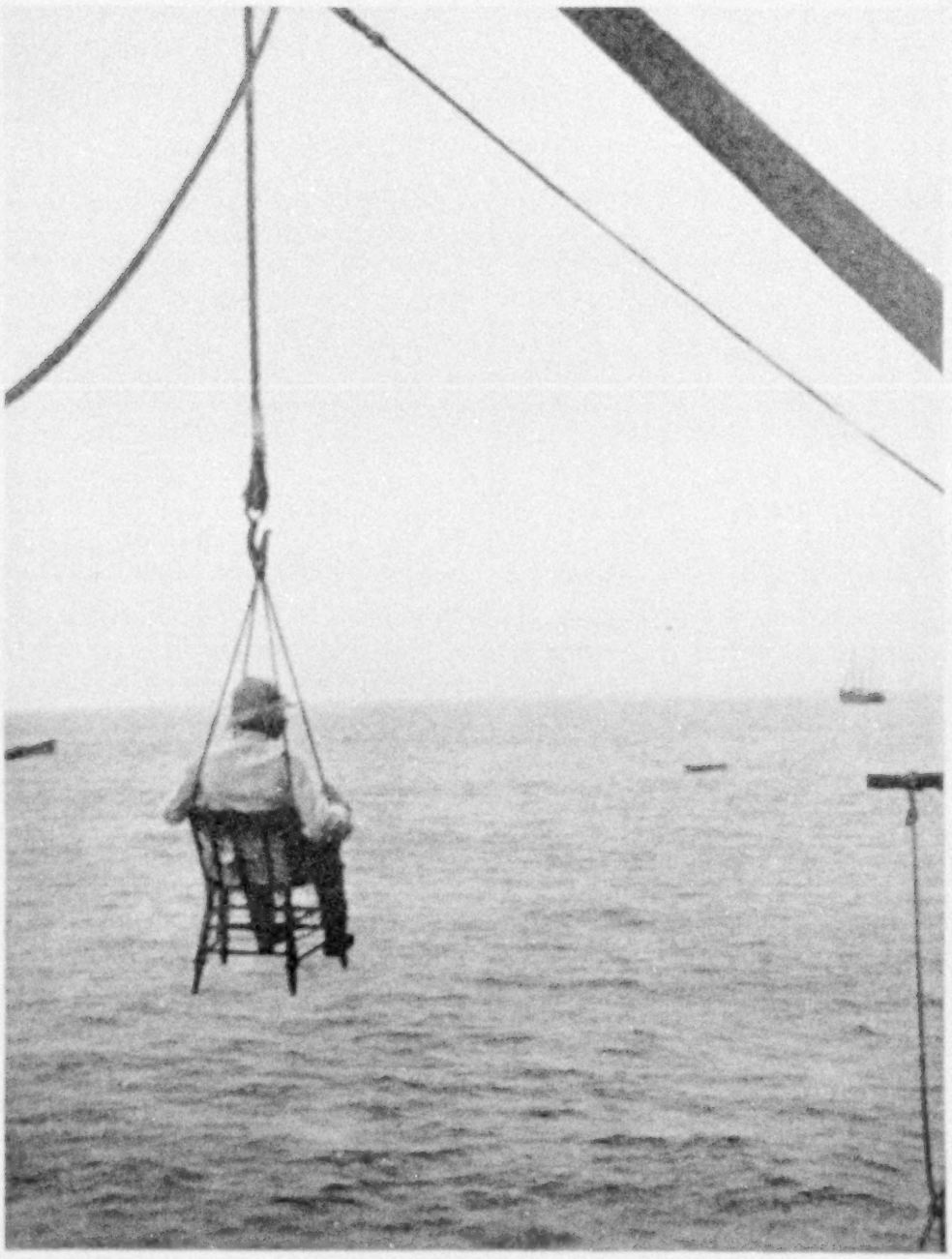
On my first visit to Salvador we disembarked at Acajutla, an open roadstead, the ship's anchorage being a mile out at sea. Through the heavy swell we went ashore in a launch, being hoisted onto the pier in a swinging, crane-operated basket (see page 190). The lift was cleverly executed, just as the swell passed under the launch.

We boarded the train for the interior and an hour later left the railroad for the saddle, accompanying our Salvadorian host to his finca, which lies among the hills of the balsam coast, 2,000 feet above sea-level. The house of the estate is set in a magnificent forest of giant balsam-trees, whose trunks bear scars made by a pre-Columbian people, who tapped them then for the scented balm in much the same method employed today.

HOW SALVADOR'S BALSAM RECEIVED ITS PERUVIAN NAME

In order to avoid the perilous passage around Cape Horn, cargoes, in Colonial days, were unloaded at Panama and transported across the Isthmus for shipment in other vessels to Spain. Peru was then the best known of the New World lands, and, in the European mind, Central American balsam, which came quickly into favor for the healing of wounds, somehow became confused with Peruvian bark, another newly discovered remedy; hence to this day it is known as Peruvian balsam.

The balsam-tree, one of the most beautiful of the tropical forest, is cousin to the acacia. It grows rather isolated from its neighbors, even from its kind, its graceful branches high above the ground. Native to the west coast of Central America, it has been exploited only in Salvador, where it grows in a limited



Photograph from Harriet Chalmers Adams

A TRAVELER BEING HOISTED ONTO THE PIER AT ACAJUTLA

From the ship's anchorage, a mile out at sea, the traveler comes to shore in a launch and is hoisted onto the pier by means of a crane-operated chair or basket. Sometimes the surf is rough and wind sways the chair. Then the traveler breathes a sigh of relief as he steps ashore.

area of 750 square miles. It has of late years been introduced into Ceylon.

I watched the balsam tappers at work. Their method is primitive. Although the tree holds sap all year round, the tapping takes place only in the dry season. The outer bark is first cut with a blunt instrument, leaving the inner bark exposed, the flow of sap being stimulated by the application of a burning torch.

After several days the sap exudes slowly, but steadily. Cloths attached to the wounds, having become impregnated with the balm, are collected, thrown into boiling water, and subjected to heavy pressure. The crude balsam settles at the bottom and the water is then poured off.

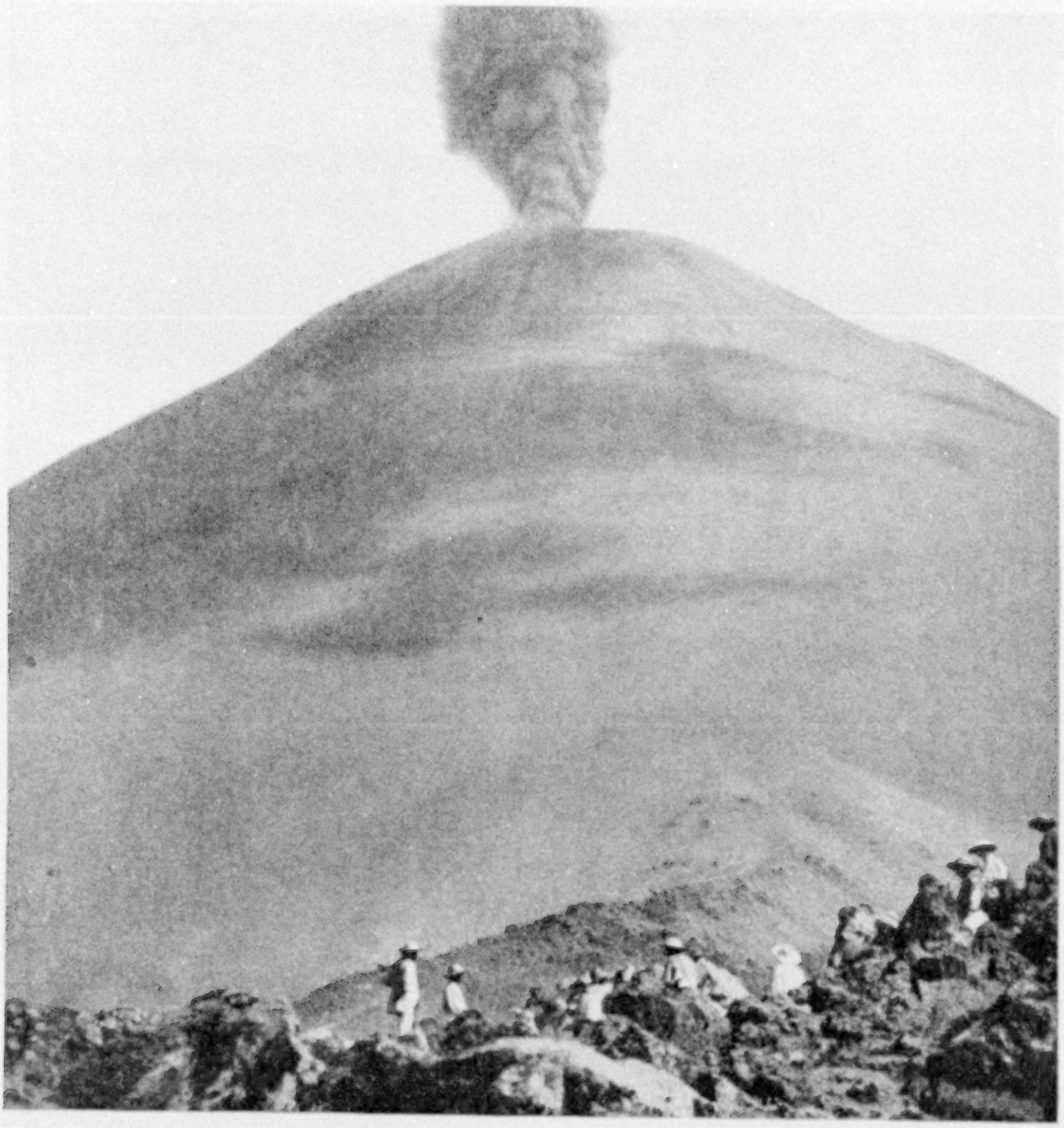
The balsam, later clarified through the evaporation of impurities, is packed in metal cases for shipment to Europe and America, where it is used for medicinal purposes and as a basis for perfume. Every morning at the finca a servant walked through the house waving a burning balsam branch. We lived in an atmosphere deliciously perfumed.

TO A BRAZILIAN SCHOOL TEACHER IS DUE SALVADOR'S PROSPERITY

In the coffee-tree, however, with its creamy flower and ruddy berry, rather than the rare balsam, lay the wealth of our host and of neighboring planters. A few seasons ago Salvador's coffee output totaled seventy-five million pounds. It goes mostly to France and the United States.

"We should erect a monument," a Salvadorian friend said to me, "to the Brazilian school teacher who, in 1840, brought the coffee-tree here from his own country. The day he planted that first coffee-tree in his garden he laid the corner-stone of our national prosperity."

The house in which we were entertained was built with a wide shaded veranda on three sides. With its French furnishings and cosmopolitan week-end guests, it might well have been situated in California or Florida; but the brick-paved courtyard, where coffee beans were spread to dry, was distinctly Central



Photograph from Harriet Chalmers Adams

IZALCO, THE SAFETY-VALVE OF SALVADOR

Some years ago the volcano Izalco ceased its mild daily eruption. With the loss of its safety-valve, El Salvador was imperiled. Soon another volcano erupted, with great disaster to neighboring towns and coffee estates, while a terrible earthquake nearly demolished the capital.

American. So were the sixty Indian families living on the estate.

The Salvadorian aristocracy is of Spanish and other European blood, many Britishers, Frenchmen, Belgians, Italians, and Germans having married into the old Spanish-Colonial families; but the masses are of Americ stock, with a Spanish admixture—that stock we loosely call Indian. Salvador boasts of having very little African blood.

Often on the highway I met a bronzed man or woman with those pronounced features and unique profile typical of the ancient Maya people whose temples, in jungle-clad ruin, are strewn from Honduras to Yucatan. Such place names as Chalatenango, Cuscatlán, Usulután, and their like hark back to the shadowy past.

In the evening, we sat in the courtyard under a brilliant canopy of stars, listening to alluring Spanish songs with guitar accompaniment and sometimes a serenade by the *marimba* players.

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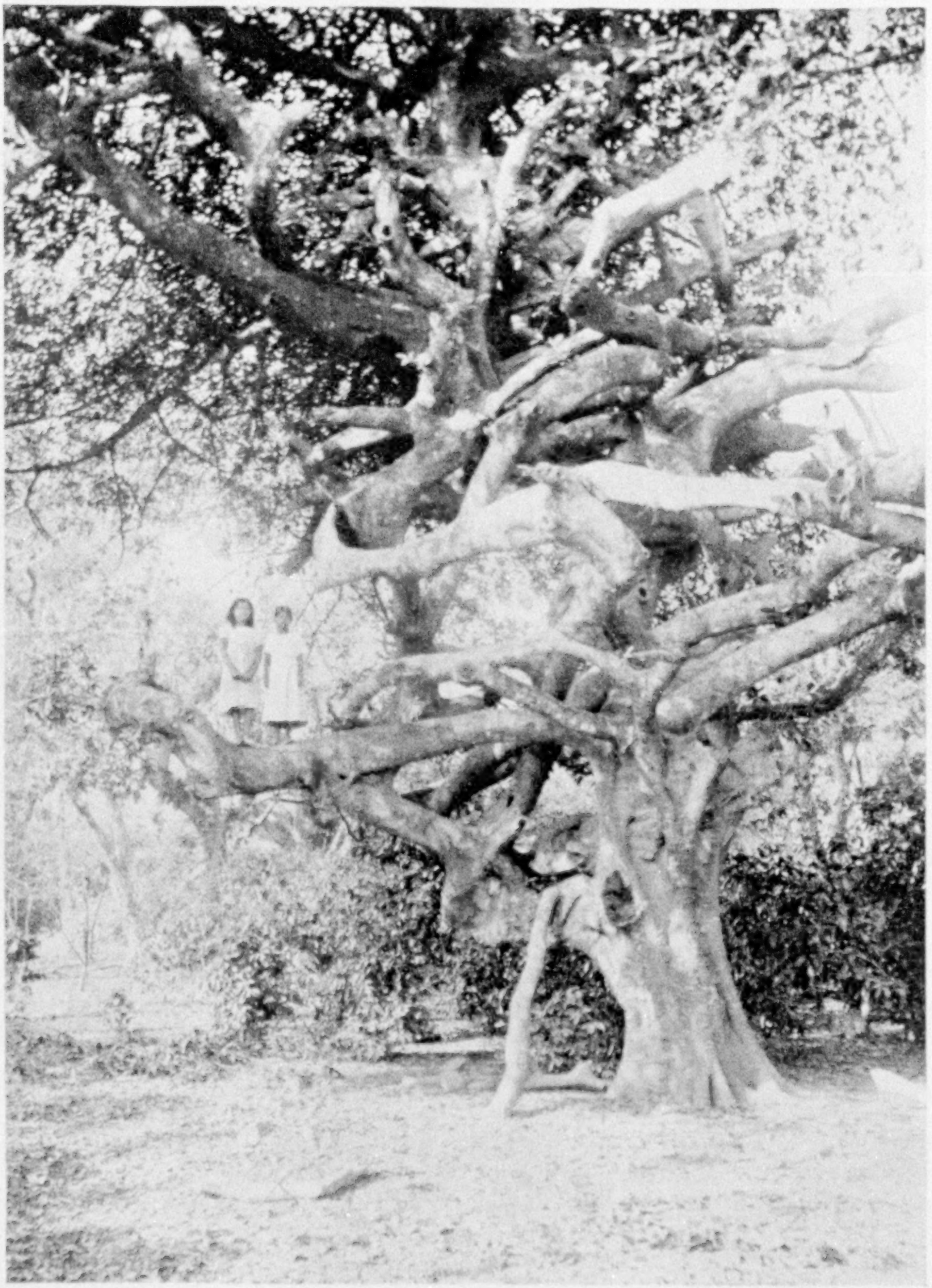


Photograph by W. V. Alford

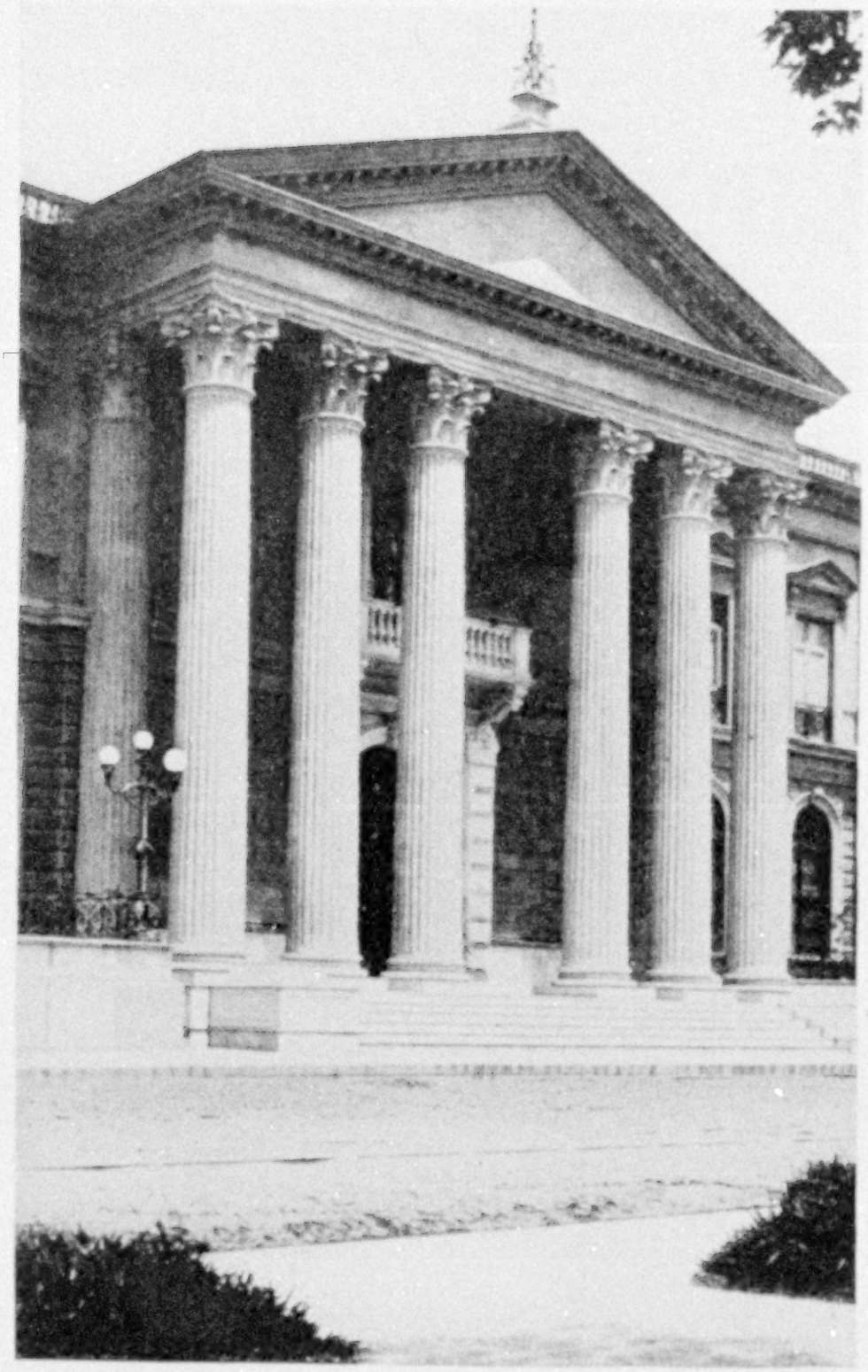
THE FANTASTIC AMATA TREE: SALVADOR

Children love to play among the twisting branches of the Amata. In the lowlands, monkeys swing by their tails from the uppermost branches, disputing the way with flocks of chattering parrakeets.

Photograph by W. V. Alford

A PLANTAIN LEAF AND A SERVING MAID

The banana and its big cousin, the plantain, are indigenous to Salvador. The banana is eaten raw, but the plantain is baked, boiled, or fried.



Photograph by A. J. Salazar

ENTRANCE TO THE NATIONAL PALACE, SAN SALVADOR

The Salvadorians of the upper class are patrons of opera and Spanish drama. Most of the coffee-planters have homes in the capital. At the leading clubs women share full privileges with the men. They are cultured and cosmopolitan, having traveled widely. Many are educated in the United States.

The marimba, a musical instrument in use among the natives before the arrival of the Spaniards, is still popular in southern Mexico and northern Central America. In structure it resembles an enormous xylophone, but in tone is more like the harp. It is played by four or eight men, who strike the keys with little rubber-tipped hardwood sticks. Now the sweet plaintive airs of Andalusia floated in on our star-lit patio; again the sad minor strains of an ancient Americ people.

VOLCANO PLAYS PRANKS WITH MINERAL SPRINGS

"Come," our host would say, when the music ceased, "let's walk up the hill and see Old Man Izalco smoke his evening cigar." Up we would climb to the summit of the ridge for a better view of the smoky-faced, rumbling-voiced volcano in semi-hourly flame.

"That mountain," one of the guests told me, "rose unexpectedly from the plain about a century and a half ago and has been shooting off fireworks ever since; but it hasn't yet changed its location, as has another volcano just north of here."

Then he told the story of a certain American who, on learning of the medicinal qualities of a spring near the Salvadorian-Guatemalan border, purchased the property and spent thousands of dollars on its improvement. Just as his work was completed and the mineral waters well advertised, a near-by volcano decided to erupt. During the disturbance the American's spring completely disappeared, later reappearing, some miles away, on another man's property. The new owner at once advertised a health resort.

Photograph from Harriet Chalmers Adams

ON A MAGUEY PLANTATION

Although Salvador has 1,400,000 people in an area no larger than the State of New Jersey, the soil, composed mostly of decomposed lava, is so fertile that the country is capable of supporting an even denser population. Great maguey and sugar-cane plantations occupy the lowland country.

Many and interesting were our trips in the saddle. To my amazement, the side-saddle provided me was constructed for the right foot instead of the left in the stirrup, just the reverse of the Anglo-Saxon way. At first I felt uncomfortable, but soon accustomed myself to the Central American style. Of late many Salvadorian women have adopted the safe and sane method of riding astride.

THE MAJORITY OF THE PEOPLE ARE LANDHOLDERS

Charming is the scenery throughout Salvador. Lowland forests alternate with highland plateaus; pleasant pasture lands with rugged valleys. Instead of fences, bordering the highway are rows of giant cacti and flowering hedges. The scarlet poinsettia flares from its emerald setting. The air is laden with the perfume of jasmine, camellias, and tuberoses, here favorite flowers. Giant ceiba trees, shading the road, harbor merry crews of chattering parrakeets. High in the branches I sometimes spied a brown monkey swinging by his tail.

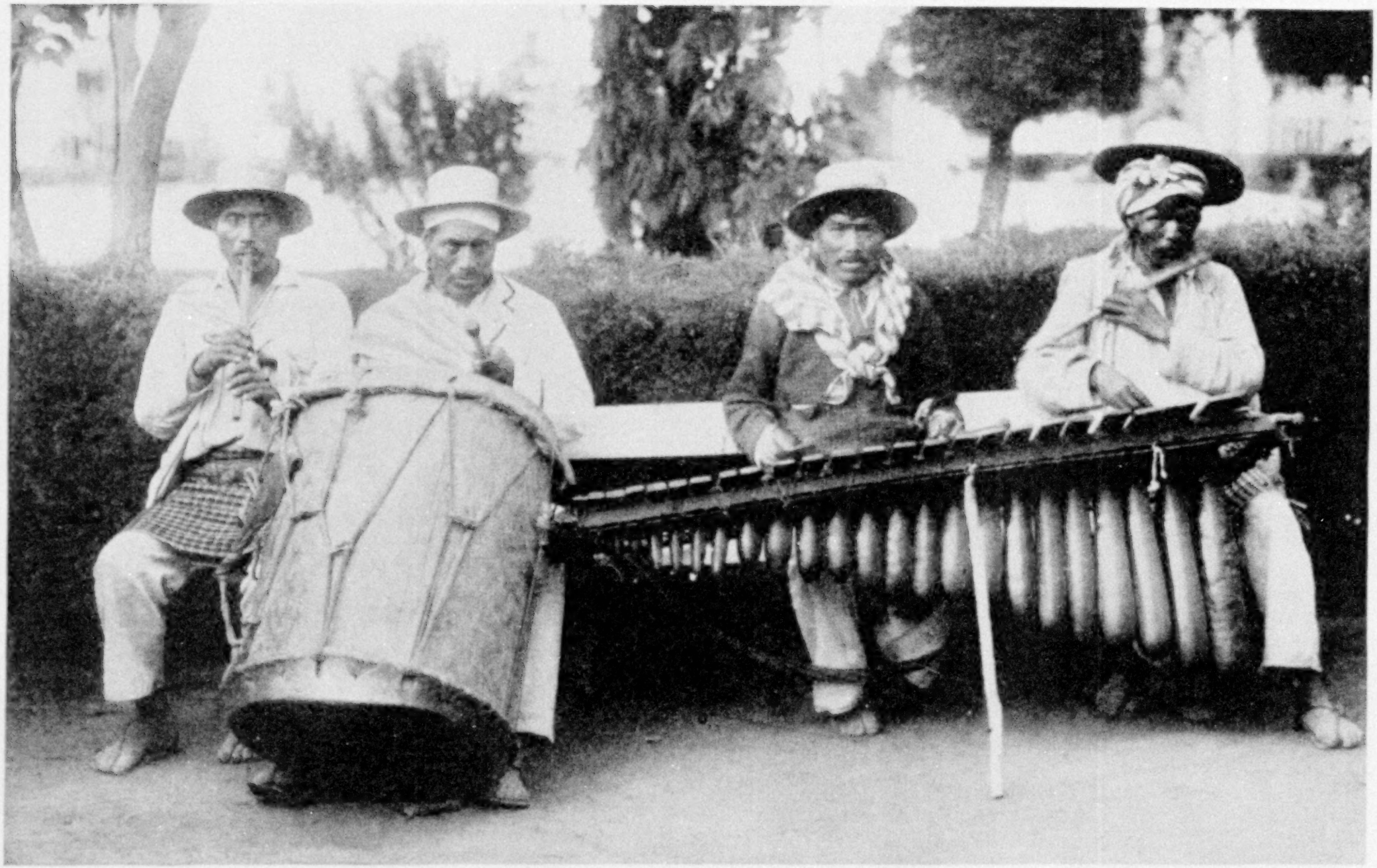
Most of the people live in the healthful uplands, the volcanic region. San Miguel, one of the highest of these volcanoes, has an altitude of 7,000 feet. Nearly the entire country is suitable for cultivation, the soil, consisting mainly of decomposed lava, being exceedingly fertile. This, and the fact that the majority of the people are landholders, accounts for the teeming population, the industry and contentment to be noted everywhere.

One of the oldest of the products, long the chief export of the country, is indigo. This native plant (*jiquilite*) supplied the blue dye of the ancient inhabitants. Sugar now ranks as an important export. In the days of the forty-niners, the greater part of the rum consumed by the California miners came from Salvador. Rice, like sugar, was brought from the Old World; but cacao, corn, and tobacco are indigenous. Turkeys are kept in flocks in the tobacco fields to devour the

Photograph from Harriet Chalmers Adams

A MARKET-PLACE IN A COUNTRY VILLAGE: SALVADOR

Almost anything can be grown in the highland region of this tropical country, two thousand feet above the sea. Corn and beans are the staple articles of food among the poorer classes. Corn cakes, sturdy cousins of our hot cakes, form the plate on which the beans are heaped.



Photograph from Harriet Chalmers Adams

MARIMBA PLAYERS, POPULAR MUSICIANS OF NORTHERN CENTRAL AMERICA

The marimba, a musical instrument which somewhat resembles the xylophone, is played by four or eight men, who strike the keys with rubber-tipped hardwood sticks, and the music is not unlike that of the harp.

worms and insects on the tender leaves of the plants.

Corn and beans are the staple articles of diet among the poorer classes. Corn cakes (*tortillas*), sturdy cousins of our hot cakes, form the plate on which the *frijoles* are heaped.

Coffee is prepared in the form of a strong extract, a teaspoonful or two being added to a cup of hot milk. Among tropical fruits, I here first became acquainted with the delicious nispero, the fruit of the tree *Achras sapota* which supplies the sap known commercially as chicle, the basis of chewing-gum (see page 111).

BY HIS OX-CART YOU KNOW A SALVADORIAN'S HOME

A picturesque touch on the highways of Salvador is the archaic ox-cart. Like the head-dress of the Andean Highlander, the Salvadorian ox-cart changes with the locality. Those with solid wheels hail from beyond the Lempa River, which flows in from Honduras. Bamboo sides on the cart indicate that the owner lives in a lowland region; cane sides, the sugar district; hide lining, the cattle country.

On one of our saddle journeys we rode up to a railroad station and bought tickets for ourselves and our mounts, riders and horses boarding the same train. Almost every train carries an animal-car. In an hour we got off and once more started across country.

One of these journeys took us through the cattle country. Cattle are not only abundant, but seem to thrive with little or no attention. Beef is moderate in price. As in all tropical countries, meat must here be cooked and eaten the same day the animal is killed.

Gold and silver rank high among Salvador's products. Up-to-date methods in gold mining were introduced twenty years ago, when an energetic American engineer obtained a property of high-grade ore and installed, with British capital, a most complete equipment. Later, acquiring a large tract of low-grade ore, he agreed to permit government students to complete their studies in mining and metallurgy at his properties. Thus Salvador secured, without expense, a modern mining school.

After the Armistice I again visited Salvador. San Salvador, the capital, with 75,000 inhabitants, is connected with the port of Acajutla by an English railway. It lies 65 miles inland and a little over 2,000 feet above the sea. The railroad crosses the territory devastated by the 1917 lava flow from the volcano, San Salvador. The country's loss was estimated at $15,000,000. It required six months to rebuild that portion of the railroad which was swept away.

SCARS OF THE LAVA FLOW OF 1917

On both sides of the track tower fantastically shaped lava hills. Here and there a great tree, which withstood the flow of boiling mud and burning lava, stands isolated among the ruins, with a tiny green oasis at its feet. I was reminded of those tragic fields at the French front as I saw them in 1916.

The capital, even in the shadow of its smoking namesake, was quickly rebuilt. Although founded in 1525, it has quite a modern air. While one-story structures predominate, there are a number of splendid government and municipal buildings of reinforced concrete and several fine parks.

Because of tragic lessons of the past, the Cathedral is constructed of wood painted to resemble stone. The capital's name, San Salvador, was chosen by Alvarado, its pious founder, in commemoration of his final decisive victory over the Indians of Cuscatlán, on the eve of the festival of San Salvador.

WOMEN ENJOY FULL PRIVILEGES WITH MEN IN SALVADOR'S CLUBS

The planters spend part of each year in their town houses. To those who picture the life of all Latin-American women as secluded and overchaperoned, it may come as a surprise that the Salvadorian women of the educated class live much as we do.

In the capital's two leading social clubs, wives, mothers, sisters, and daughters of members enjoy full privileges with the men. Many of these women have been educated abroad, are accomplished linguists, go in for athletic sports, and share with the men the responsibility of large country estates.

The upper classes are most progressive, a large proportion having traveled exten-

Photograph from George R. King

THE COUNTRYWOMEN OF SALVADOR ARE INDUSTRIOUS AND CONTENTED

Most of the Salvadorians are land-holders in a small way, which accounts for the universal industry and contentment. The women do most of their household work out of doors, under the shadow of the trees. Among the lower classes Indian features are in evidence. There is very little African blood in Salvador.

sively and adopted foreign ways of living. Their adaptability, energy, and patriotism promise much for the future of a country so richly endowed by Nature, one which could easily support double the population.

Lake Ilopango, a favorite society resort, ten miles by motor highway from the capital, is a scenic gem. The surrounding verdure-clad mountains dip steeply into the sapphire lake. Hotels and bath-houses dot the shore and launches skim merrily over the water.

While the elite buy in Europe and the United States, the masses content themselves with native manufactures, wearing home-made clothes, hats, and shoes. Many cling to the primitive type of dwelling, dirt-floored and thatch-roofed, so well suited to the climate.

There are a few shops in San Salvador with our type of show-windows, but the majority of the stores are the kind found in most Latin American towns, in Spain, and the Orient, where one main entrance serves for door and window. Here everything from lard to stationery is sold.

The main market overflows into the surrounding streets. Besides the native merchants, Chinese, Turks, and Arme-

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nians are in evidence. Delicacies in the food line, unfamiliar to us, are fresh-water shrimps the size of small lobsters, tortoise eggs, and snails.

City property pays a tax, but rural property pays nothing to the state and only a small sum to the municipal authorities. The main income of the state comes from the export and import duties, the exports exceeding the imports.

Many of the small farmers are tradesmen as well. Coming into town with their ox-carts laden with country produce, they return home with supplies for their own stores. Fully 85 per cent of the nation's commerce belongs to natives.

SALVADORIANS WERE FIRST TO ATTEMPT FEDERATION

The Salvadorians were the first to attempt, many years ago, the establishment of a Central American federation. This union, again effected, embracing the republics of Honduras, Salvador, and Guatemala, may ultimately include Nicaragua and Costa Rica. The city of San Salvador would seem to be the logical center of the new republic, but Tegucigalpa, Honduras, which has been chosen as the capital, would prove a more central point for an expanded Central American union.

On leaving the capital, I motored across country to the port of La Libertad, which, like Acajutla, is an open roadstead. East of La Libertad lies the landlocked harbor of La Unión, in the beautiful Gulf of Fonseca—a gulf shared by Salvador, Honduras, and Nicaragua.

An American railway is being built from La Unión to San Salvador. At the time of my last visit all but forty miles of this line had been completed, the remaining link being covered by auto-stage. West of the capital the same company has completed the railroad to within 105 miles of Zacapa, the nearest point on the Guatemalan Railway. When this stretch is finished Salvador's capital will have rail communication with New York and be in close touch with Puerto Barrios, the Guatemalan port on the Atlantic seaboard.

The Salvadorians now reach our eastern States by steamer from Acajutla to San José de Guatemala, on the Pacific; by rail across Guatemala to Puerto Barrios; by sea to New Orleans. The west-coast voyage to San Francisco is popular.

Many Central American boys and girls are educated in San Francisco, where there is a large Spanish-speaking colony. I should say that one's visit to Central America really begins the first day out at sea from San Francisco, as the majority of the passengers on all ships bound for Panama are Central Americans.

It was in the Gulf of Fonseca that I became acquainted with the tortoise-shell industry. The shell of commerce is obtained from one species of turtle out of a variety of nearly two hundred. This is the hawksbill* which abounds in Central American waters. The turtle was revered by the ancient inhabitants of this region, as evidenced by the sculptures on the altars of the Maya.

In the Gulf of Fonseca a fleet of diminutive schooners sails out to gather the tortoise-shell. Each turtle boat carries a number of smaller boats equipped with a net weighted with lead, and a water-glass.

On reaching the fishing ground the small boats are sent out with two men each, the expert at the bow searching the bottom of the sea through the water-glass. This instrument is a wooden box with an ordinary window-pane fitted into one end. In the clear tropic waters the bottom can be seen at the depth of one hundred feet or more.

When the turtle is discovered on the sea floor, it is netted; when swimming under the surface, harpooned. Sometimes the animal is killed outright and the thirteen plates of the carapace forcibly detached; again the shell is softened by applying heat.

From the mottled, transparent shell, native workmen fashion combs, brooches, trays, and innumerable small articles. The lack of proper equipment for cutting and polishing makes the combs on sale at La Unión a bit rough for use. I later had my really beautiful Salvadorian comb smoothed and polished.

I think of El Salvador as a fresh and smiling little country whose people form a limited aristocracy, cultured and hospitable; an increasing middle class, industrious and happy; and, nearer the soil, a mass of *peons*, poor and ignorant, but well nourished and contented.

* See "Certain Citizens of the Warm Sea," in the January GEOGRAPHIC.

COSTA RICA, LAND OF THE BANANA

By Paul B. Popenoe

THE geography of Costa Rica is a repetition of that of its sister republics of Central America: masses of mountains arranged without much regard for symmetry, but furnishing many fertile valleys and occasionally spreading out into rich table-lands which provide admirable grazing; few navigable rivers or good harbors, and a low, rich coastal plain, hot and unhealthy.

Its northern and southern boundaries, long in dispute with Nicaragua and Panama, respectively, have recently been settled by the usual procedures of compromise and arbitration. The northern boundary was important half a century ago, when the only access to the republic on the Atlantic side was through Greytown, Nicaragua, by canoe up the Colorado River, and thence on horseback over a rough trail to the capital. The establishment of Port Limon allowed this traffic to die and the northern portion of the country to relapse into its primitive condition.

The Aguacate range is largest in the mountain system, but many of the greater peaks are more or less isolated, rise as high as 11,000 feet, and are often active volcanoes. Blanco, in the south, is considered highest; better known is Irazu, which is blamed for earthquakes that have twice practically wiped out the city of Cartago, lying at its base.

SAN JOSÉ IDEALLY SITUATED

San José, the capital city, with 50,000 inhabitants, including its suburbs, is set near the center of the republic, in a broad valley surrounded by picturesque mountains. It is the nucleus of the coffee district, holds a strategic position with regard to the Aguacate Mountains, chief source of mineral wealth, and is favorably situated for shipping to all points in the interior. Most of the developed land is east and west of it, the territory north and south being much less utilized.

Although the coast is lacking in good harbors, that at Port Limon, on the Atlantic side, has been converted into a satisfactory port of entry by English capital. The Pacific port of entry, Puntarenas, is still lacking in wharfage facilities, but is well protected by its situation in the broad Gulf of Nicoya, one of three great indentations which make the republic conspicuous on any map.

Below the Gulf of Nicoya, which runs up 50 miles to the broad plain of Guanacaste, where stock-grazing is the principal industry, is the Golfo Dulce, a large inlet into a region which is still undeveloped.

CHIRIQUI LAGOON AS LITTLE KNOWN AS IN COLUMBUS' TIME

Opposite Golfo Dulce, on the Atlantic coast, is the Bay of Boca del Toro and the famous Chiriqui Lagoon, which figures so largely in Columbus' account of his voyage along the coast and is still nearly as unknown as when he saw it. The Indians continue their primitive life, resenting intrusion from strangers, and the authority of the government there is as nominal as that of Mexico over the Indians of remote Yucatan.

There are no lakes of any size within the republic. Navigable rivers are nonexistent, save for some tidal streams along the coast that play an important part in the transport of bananas to the point of shipment. The streams of the country are mere mountain torrents, in some places deep enough for canoe travel, but more valuable as sources of power.

The Pacific coastal plain is narrow and unimportant, occupied by jungle, where the principal industry is hunting monkeys for their skins, which usually appear on the furrier's list under an entirely dissimilar name. At the head of the Gulf of Nicoya was formerly a great hunting ground for egrets, but it is very likely exhausted by this time.

The Atlantic coastal plain is wider and richer, chiefly given over to the banana industry.

As will be judged from the description, Costa Rica is not overpopulated. With an area about half that of the State of Pennsylvania, the latest estimate (December, 1918) was 459,423 inhabitants, of whom only a few thousand were set down as aborigines. It is probable that

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Photograph by H. Wimmer

LOADING A STEAMER WITH BANANAS AT PORT LIMON, COSTA RICA

With the decline in the price of coffee at the beginning of the century, the banana became the "staff of Costa Rican trade." Forty years ago the annual export of bananas was not more than 3,500 bunches; today, in banner years, the number reaches 9,000,000, and three-fourths of the fruit comes to the United States.

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Photograph by H. Wimmer

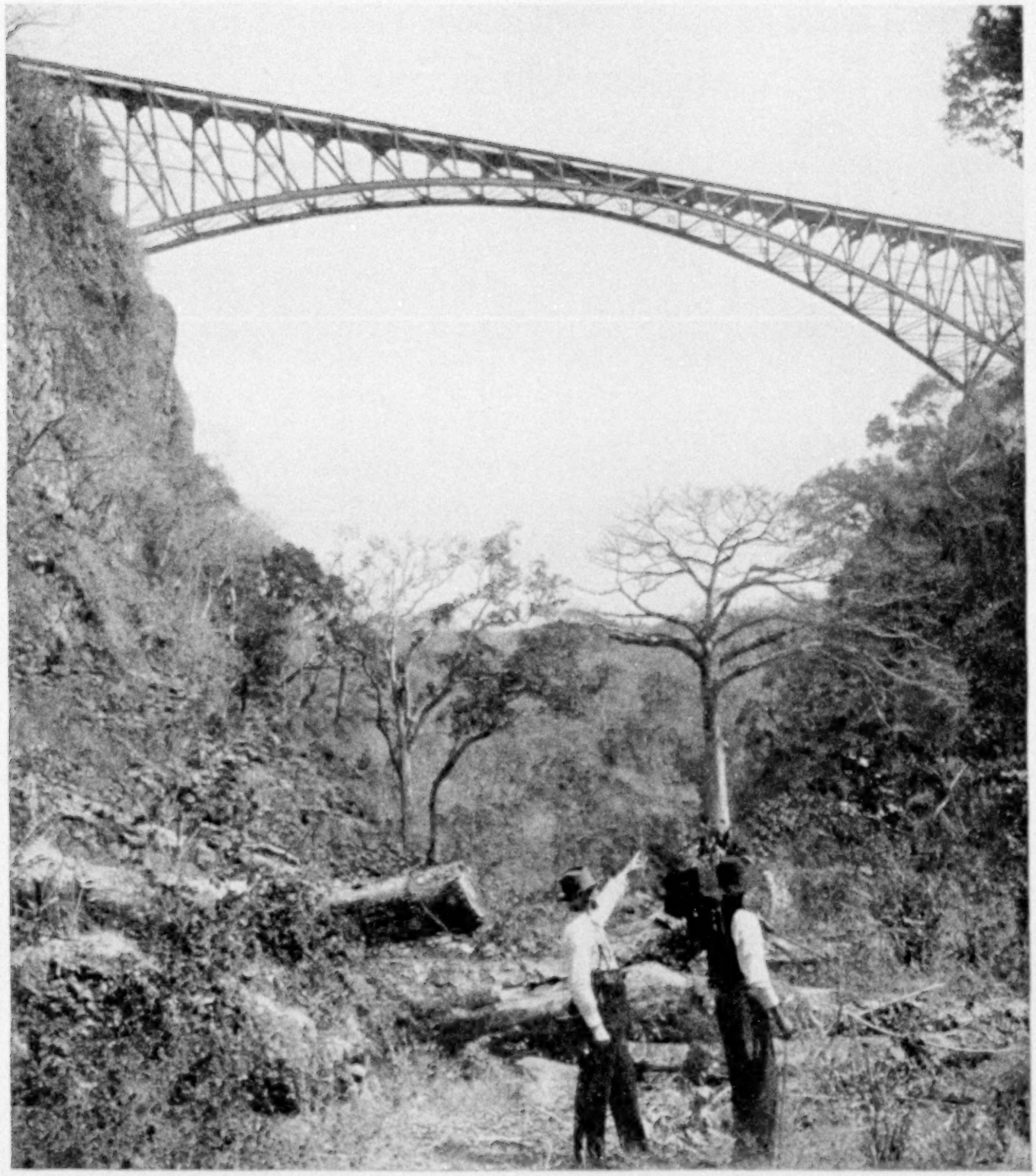
PICKING COFFEE IN COSTA RICA

The towering bananas are planted in the coffee groves to provide shade for the more delicate tree. The tedious work of picking the ripe coffee berries is done chiefly by women and children. As the berries are picked they are taken by ox-cart to the near-by mill, where the pulp is torn away from the beans, which are allowed to ferment in water for a few hours, then dried for a week, polished, sacked, and shipped (see text, pages 207 and 208).

Photograph by H. Wimmer

CUTTING BANANAS ON A COSTA RICAN PLANTATION

A cutting "gang" usually consists of three men. The "cutter," using a long pole to which a special kind of knife is attached, nicks the tree trunk—in reality a leaf-sheath—a few feet beneath the bunch, the weight of which makes the trunk bend where it has been cut. The bananas are then eased upon the shoulders of the "backer," who carries them to the "muleman," or to the freight cars. The tree is then cut off near the roots, its decayed stalk acting as a fertilizer for the soil.



Photograph by Central News Photo Service

THE RAILWAY TO COSTA RICA'S ATLANTIC COAST TRAVERSES PICTURESQUE COUNTRY

Costa Rica now boasts 402 miles of railway, connecting its capital, San José, with both the Atlantic and Pacific ports and penetrating the interior. When proposed lines are completed, Port Limon, on the Atlantic side, will be connected by rail with the new port of Almirante, in Panama.

many genuine aborigines were not enumerated, however; and of course many of mixed blood, who are far more Indian than Spanish, were excluded from this category. There are some 18,000 colored British West Indians on the banana farms of Limon province.

Mixture of blood is naturally the basis of the whole population, but the Spanish element preponderates to a greater extent than in any other Central American republic. This European infusion is evident everywhere—in the superior intelligence and civilization of the inhabitants and in the excellence of the Spanish which is universally spoken.

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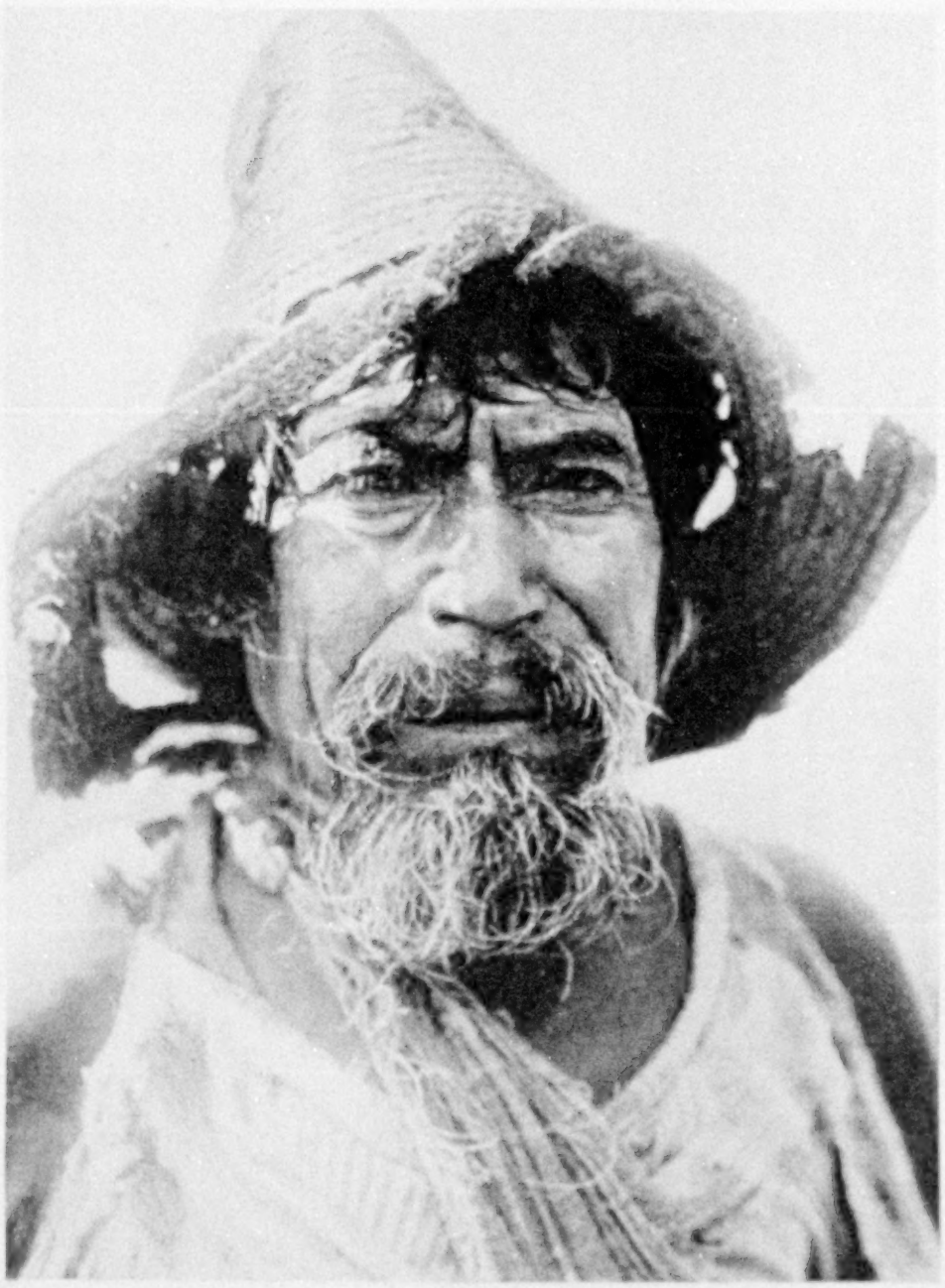


© Publishers' Photo Service

A PEON TYPE OF COSTA RICA

Then, too, the aborigines seem to have been a mild, easy-going race of agriculturists, with none of the lust for martial conquest that characterized some of the Mexican and Guatemalan stocks, and this undoubtedly played a part in forming the present-day population.

Graves of these original inhabitants, which are being constantly unearthed, indicate that they had a fair amount of civilization, making passable pottery and working many ornaments rather crudely in gold, although stone images which they have left show that artistically they were far inferior to the civilizations of the Mexican-Guatemalan region (see pages 109-130).

These images are a constant object of search, of course, in all parts of the republic, and the frequency with which they are found shows alluvial gold to have been more plentiful some centuries ago than it is now.

Aside from Spanish immigrants, who are numerous, the foreign population is only a few thousand, mostly men engaged in business or mining. Plantations are in the hands of natives, outside the banana industry.

MILLIONS OF BUNCHES OF BANANAS EXPORTED ANNUALLY

It is needless to say that agriculture is the chief industry and resource of the republic. In fact, just now it is almost the sole resource, since manufactures are lacking and mining is almost suspended. Bananas hold first place, with 95,400 acres under cultivation; coffee follows, with an annual yield reaching 24,000,000 pounds. Maize, sugarcane, rice, and potatoes are other important crops.

Costa Rica's banana industry has been created by an American fruit company, which has a monopoly. The rankly fertile soil of the coast has been cleared of natural growth and plantations extended year by year, principally to the north of Port Limon, while light railways bring the crop to tidewater, where it is loaded on barges and taken to Port Limon for transshipment in the company's own steamers (see page 202).

The republic sends to the United States more bananas than any other country—from 7,000,000 to 9,000,000 bunches a year—and they are of high quality. As the industry represents an entirely for-

© Publishers' Photo Service

THE SUNSHINE OF A COSTA RICAN SMILE

eign exploitation, it is not of such vital interest to the people as is coffee. A failure of the banana crop affects the profits of the fruit company; a failure of the coffee crop affects every bank in Costa Rica, and may even threaten the stability of the administration then in power, since voters do not always reason closely from cause to effect, in times of financial stringency.

AMONG BLOOMING COFFEE-TREES

Surely, not even Japan in cherry-blossom time can be more beautiful than the coffee country, occupying valleys at an elevation of from 3,000 to 5,000 feet, when the snow of the blossoms hangs like a mantle over the land, and their perfume subdues the strong scents of the forest. Plantations are mostly small, peasant proprietorship being the rule, and each has its one-room house with a tile or corrugated iron roof covering a heterogeneous assortment of men, women, and children, monkeys, parrots, and dogs. But the industry can be better studied on a larger *finca*, that of 50 acres, which I have in mind, near San José, supporting 50,000 trees.

As we walk between the rows of bushes, six feet high and colored with the deep but vivid red of ripe berries, the manager explains the situation.

"These trees," he says, "are five years old and just beginning to bear profitably. They are kept two years in our nursery and then transplanted to the orchard, where it requires three years to bring them to maturity. They will then bear for five or six years, when they cease to be profitable and are cut down.

"We are planting new trees every year in the place of old ones, and thus keep our plantation at the highest point of bearing efficiency all the time (see p. 208).

"These bananas you see planted among the trees are for shade, which the coffee-tree requires constantly, especially when young" (see page 203).

The coffee is being picked at the time of our visit. The work is mostly done by women, with a few men and children scattered among them. A peon can put his whole family to work during coffee-picking time and have them earn enough to support him in idleness for the rest of the year. The work is slow and tedious,

Photograph from Mrs. Martha Toeplitz

A YEAR-OLD COFFEE-TREE

For the first two years the tree is kept in a nursery, and then transplanted to the orchard, where it requires three years to come to maturity. Its bearing life is from five to six years, after which it ceases to be profitable and is cut down. Costa Rican coffee finds its best market in London, while the United States seems partial to the Brazilian product, which constitutes more than half of the billion pounds we consume annually.

as the berries are scattered and must be picked one at a time by hand and dropped in a basket; but the women can gather 200 pounds in a day.

As fast as the berries are picked they are hauled by ox-cart to the *beneficio*, or mill, whither we now turn our steps.

"How many laborers do you employ?" we ask.

"During the wet season, or from January to July, only three or four—just enough to keep the weeds down; but during the dry season, when coffee is ripening every day, we have to keep 15 or 20 pickers constantly on hand, besides a dozen men to cure the beans."

PREPARING COFFEE FOR MARKET

The process of preparing coffee for market is, briefly, as follows:

As fast as the berries are brought in, they are put through the pulper, a machine something like a corn-sheller, run by a water-wheel, which tears off the outside pulp from the beans and separates them. The beans are then put into a large tank and allowed to ferment overnight in water, after which they are thoroughly washed by being worked over with a large wooden hoe in running water and trampled out by the bare feet of the peons. During this process the dirt all comes to the top and is carried off by the current.

The beans are then spread out in the sun, on a cement floor, and allowed to dry for a week, being turned over every day (see illustration, page 188). When dry, they are put through the huller, which takes off a thin, parchment-like inner skin; they are then winnowed, put through a polishing-machine, sacked, and shipped.

"How much does the plantation yield?"

"We consider a yield of one pound per tree, or 1,000 pounds to the acre, good, although this is often exceeded. As you can easily see, the business is profitable. The main drawback is the amount of time

and money which must be spent before any returns come.

"We often plant corn or vegetables between the coffee rows while the shrubs are young; but this does no more than pay expenses at best, and many investors do not like to wait five years before they receive any returns on their money. Still, with the right management and a good climate, no one ought to lose money on coffee."

It is a mistake to suppose that the best coffee is grown in the Orient, and to talk fondly of "Mocha and Java," the first of which is seldom, if ever, and the second rarely, sold in the United States. Costa Rican coffee in open competition has several times brought the highest price on the London market, whither most of it is shipped.

Photograph from U. S. Department of Agriculture

COFFEE FLOWERS AND FRUIT, NATURAL SIZE

Not even Japan in cherry-blossom time is more beautiful than the valleys of Costa Rica, at an elevation of from 3,000 to 5,000 feet, when the coffee-trees are in bloom, the snow of their blossoms hanging like a mantle over the land and their perfume subduing the strong scents of the forest. The coffee berry is a vivid red when ripe.

Maize is grown by primitive methods, solely for local consumption, and the same may be said of sugar-cane, which is largely used for fodder, but also produces coarse varieties of sugar for home use. All the usual tropical and temperate vegetables and fruits are grown to a limited extent. The oranges of Costa Rica are excellent.

THE REPUBLIC IS RICH IN MAHOGANY, ROSEWOOD, AND CEDAR

There is some export trade in valuable timber, of which the great forests furnish a wide range, including mahogany, rosewood, and cedar. Enough cacao is grown for home use. Rubber is gathered from wild trees.

Mining has been carried on for a century, following a visit of the Bishop of Nicaragua and Costa Rica in 1815, who pointed out the rich deposits of gold in the Aguacate Mountains. These produced $7,000,000 in 20 years, under the most difficult conditions, the composition of the ores being such that they had to be sent to the Pacific coast in ox-carts, loaded into sailing-vessels, and shipped around the Horn to Europe for smelting. The high-grade ores were used up in this way, and although there is an immense body of ore carrying lower values, well

Photograph by H. N. Rudd

A PICNIC PARTY IN COSTA RICA

The Costa Ricans are among the most progressive of all the peoples living between the Rio Grande River and the Panama Canal. English capital predominates in that country. The Costa Rican children are as sunny as the skies under which they live, and picnicking time is next to Christmas in their affections.

worth handling, no one has come forward with sufficient capital to erect the expensive plant necessary.

COSTA RICA MAY BE GREAT GOLD-PRODUCING STATE

Since the abandonment of work in the Aguacate range, half a century ago, practically all the mining interests have been concentrated on the Pacific slope, where are immense ore deposits carrying gold in low values.

With further development of railways and possibility of obtaining power from streams of the coast mountains, mining is certain to have a renascence throughout the republic, which will take its place as one of the great gold-producing states of Latin-America, in the opinion of many.

The principal manufacture is that of alcoholic liquors, a government monopoly. With agriculture and mining, the list of industries is exhausted.

Public safety is as good as in the United States—I fear I must say that it is better than in some parts of the United States—and security almost absolute. It is a common saying that when a theft is reported it is almost never traced to a Costa Rican, but to an immigrant, of whom there are a good many from the West India islands, principally Jamaica negroes, who have been imported to work on the banana plantations because of their ability to stand the feverish lowland climate, which Europeans and Costa Ricans can ill tolerate.

RAILWAY LINE COMPLETED FROM SEA TO SEA

Development of the resources of the nation and of public utilities has been steady and reasonably rapid during the past 20 years. A railway line has been pushed from sea to sea, by way of San José, in spite of great engineering diffi-

Photograph by H. N. Rudd

TALAMANCA INDIAN GIRLS GRINDING GRAIN

Though these people live within a few miles of a Costa Rican railroad, they are almost totally unaffected by modern civilization. The dialect which they speak is derived from the Guetar, the dominant tongue among the Caribs.

culties. The capital has electric lights, a good electric street railway, modern sewerage, and telephones.

Although the country owes everything to foreign capital, I believe no large concessions have been given which deprived the natives of opportunity, as many Mexicans claim has been the case in their own country; for the great holdings of the American fruit company are in a region that was formerly swamp and jungle.

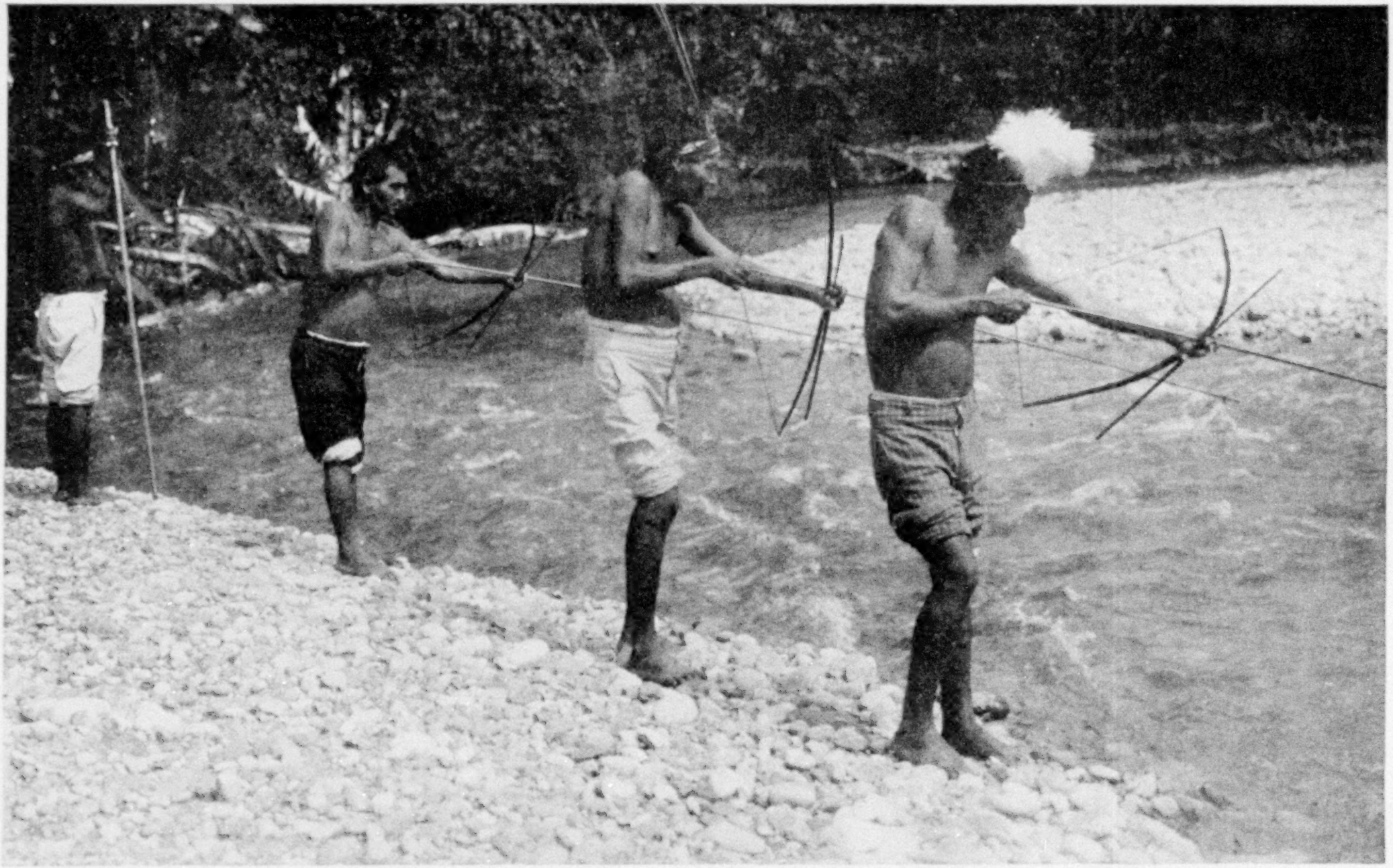
Besides its connections with New Orleans and New York, the Atlantic coast has direct sailings to Europe and Great Britain, while the Pacific coast is touched by steamers from San Francisco to Panama.

Sanitary conditions in the country have been rapidly improved. Yellow fever, which formerly exacted a terrible toll in the banana country of the Atlantic littoral, has practically disappeared. San José and most of the other principal cities are at such an altitude that the climate is temperate, with a mean of 60 to 70 degrees, and they are healthy.

THE STORY OF COCOS, A REAL TREASURE ISLAND

Costa Rica has one resource which is worth a digression — Cocos, a palm-fringed islet 400 miles from the mainland, off the Pacific coast of Panama. It is the supposed hiding place of the immense treasure carried from Peru a couple of centuries ago on the schooner *Mary Dyer,* which was wrecked on the island.

The story is familiar to every newspaper reader—how a revolution threatened, and all the treasure in Lima was placed on this schooner in the harbor. In the night the crew mutinied, anticipated the looters of the city, and sailed out of port with practically all the wealth of the town on board.



Photograph by H. Wimmer

TALAMANCA INDIANS FISHING WITH BOW AND ARROW: COSTA RICA

These Indians, who resemble the Maya of Yucatan in physical appearance, keep up their ancestral speech, usages, and traditions. They bury their dead in graves called *guacas,* which in times past have yielded up interesting specimens of pottery and an occasional gold ornament.

Various charts are in existence purporting to give the exact location of the hoard, which has been a constant object of search, so that in recent years a dozen or more expeditions have started or tried to start to bring it home. Those which finally arrived at the island have all failed, although many of them came away with their share of eternal hope undiminished, and I suppose the desolate place is still in possession of its long-time inhabitant, a Dutchman who digs around in haphazard fashion and raises pigs, which he can always sell at a good profit to the next exploring expedition. His mind has been unbalanced by the solitude; if he should find treasure, it will have been dearly bought.

Nearly every Costa Rican believes in the hoard; in fact, when I first went to San José I found the American consul just starting out on the quest. President Iglesias was a firm adherent of the story and put the island under strict government control, granting special concessions—for a price—to those who wished to dig. Nearly 20 years ago, when the national treasury was low, he organized an official government expedition which he expected would put the country beyond the need of taxation for the rest of its history.

The navy of the nation was very useful on this occasion to transport the party, which returned empty-handed in spite of the fact that it had been accompanied by an American with a divining rod. This was an old umbrella rib, with a bottle of "big medicine" attached to one end, and had never before been known to fail, as the inventor himself admitted; so if its testimony was true on this occasion, then the report is well founded that the pirates returned and carried off their treasure only a few years after they buried it.

REVOLUTION MADE SAN JOSÉ CAPITAL

Next to San José, Cartago is the most interesting city, having been the seat of government under Spanish rule. When the republicans established independence, in 1821, a faction in Cartago attempted to hold the province for Spain; whereupon the victorious party settled the question by removing the capital to San José, then an insignificant mountain town.

Cartago remained for years the place of residence of the aristocrats, and was also famous for its pilgrim church, "Our Lady of the Angels," built over a spring which was sought from all parts of the country for its reputed miraculous cures. More recently it sprang into prominence as the location of the peace palace which Andrew Carnegie built to solidify the friendship of the Central American republics and which, it will be recalled, was destroyed by an earthquake.

CARTAGO, DESTROYED BY EARTHQUAKE, SUBSTANTIALLY REBUILT

Cartago has always been subject to earthquakes because of its position at the foot of an active volcano. It was completely destroyed in 1841, following which it was rebuilt in a substantial way.

Alajuela and Heredia are the two largest towns on what was until a few years ago the national cart road from San José to the Pacific coast, over which all the traffic of the country passed for a century or more, although the railroad has now superseded it.

Heredia, with its historic churches, is one of the oldest and most picturesque places in the republic, while Alajuela is equally interesting. Associated with the latter's old fort are some of the most stirring events in the history of the nation.

The only other towns of importance are Liberia, the isolated capital of the province of Guanacaste, and the two ports of entry, which I have already mentioned. Puntarenas is decaying, as its Atlantic rival gains the trade. The latter contains a large English-speaking population, both white and black, due to its banana industry (see pages 202 and 204).

For beauty in Costa Rica one must, as a general rule, stay outside the cities. The country is as fine as any in the Western Hemisphere. I have met numerous globe-trotters who tell me they put views from the Aguacate Mountains (where, on a clear day, both oceans can be seen) with the two or three finest bits of scenery in the world.

The savannas, or meadows, on the Pacific slope are a perpetual joy, looking more like parks than like wild land, with their long grass and graceful palms. At every turn of the road one comes across a thatched hut with its peasant occupants,

Photograph by H. Wimmer

TALAMANCA INDIANS WEIGHTED DOWN WITH HEAVY STONES TO AID IN MAINTAINING FOOTHOLD IN CROSSING A SWIFTLY FLOWING STREAM: COSTA RICA

Costa Rica is watered by innumerable rivers, some of which flow into the Atlantic and others into the Pacific, but few of them are navigable and those only in their lower courses.

or, if he be farther from civilization, sees a troop of monkeys just out of reach, making faces at him, while in the lowlands a flock of macaws is generally near by, to add splashes of riotous color to the scene.

The peasants, who make up so large a proportion of the population, are an interesting class. Their lives are primitive, without any dispute; they have little more in the way of material possessions than their ancestors had when Columbus traded tin knives and hawks' bells for their gold ornaments. They cannot be considered industrious, for Nature provides a living too easily. The usual procedure is to burn off the sides of some ravine, plant it as a truck garden for two or three years, and then abandon it in favor of another piece of virgin soil.

Small black beans (*frijoles*) are the staple crop, which with the *tortillas*, or hoecakes of Indian corn, a little rice, and such fruit as can be had without labor, make up the exclusive diet of a large part of this agricultural population, save for an occasional bit of game which the head of the house brings in. This will probably be a small monkey, the flesh of which is esteemed a great delicacy, even by white people who have been able to overcome their anthropophagous squeamishness; but the mortality among the four-handed tribe is kept down to reasonable limits by the government's stringent enforcement of a law which prohibits importation of any guns except muzzle-loaders.

CHINESE IMMIGRATION IS A BIG PROBLEM IN CENTRAL AMERICA

Corn is probably grown in the peasant's dooryard, but the rice will have come from a Chinese trader in the neighboring village.

Chinese immigration is more of a problem in Central America than it ever was in California, if the inhabitants only knew it, for the Orientals do not stoop to manual labor, but have taken possession of a large part of the retail trade. It is an insignificant town that has not one or

Photograph by H. Wimmer

TALAMANCA INDIANS BRINGING IN THATCH

more of these Celestials, usually almost ignorant of the Spanish language, yet driving out competitors by underselling and getting rich by the closeness of their business methods. Natives seem to have a friendly feeling for Chinese, but I did not observe many cases of intermarriage.

A PEON'S GALA DAY

The Chinese merchant also furnishes the small stock of clothes needed by the peon: for the women, a skirt and low-cut waist; for the men, shirt and trousers. The shirt is often discarded in mining and many other branches of labor. Country children, of course, dispense with the luxury of clothes for the first decade of life.

On Sunday the whole family visits the nearest village to put in a gala day. Perhaps there is a religious festival in the morning; at any rate, there is a mass to be attended. Afternoon is given over to visits, which women and children usually make alone, while the man of the house hangs around the general store or post-office, as the center of interest. If he is feeling "flush," he treats himself to a can of evaporated milk, a great luxury, which he drains off through a nail-hole, just as if it were champagne.

Too frequently, however, he unearths a jug of moonshiners' liquor, a violent beverage, which is manufactured in many huts in spite of the activity of government revenue agents. If there is any of this stuff in circulation, he usually ends the day by indulging in a machete duel with his best friend, and both principals spend the night in the jail, which even the smallest villages maintain for such eventualities. The duelists awake good friends the next morning, but unfit for work for another day or two.

Bullfighting is rare in the republic; the only ring, I believe, is in the capital, and that is seldom used. Cockfighting flourishes to a certain extent, but not so much as in the more northern republics. Lotteries are popular.

SAN JOSÉ BOASTS ONE OF THE WORLD'S FINEST OPERA HOUSES

The native is an inveterate lover of pleasure and never grudges a day missed from work, if he can obtain entertainment by such self-denial. The capital contains a monument to this spirit in its

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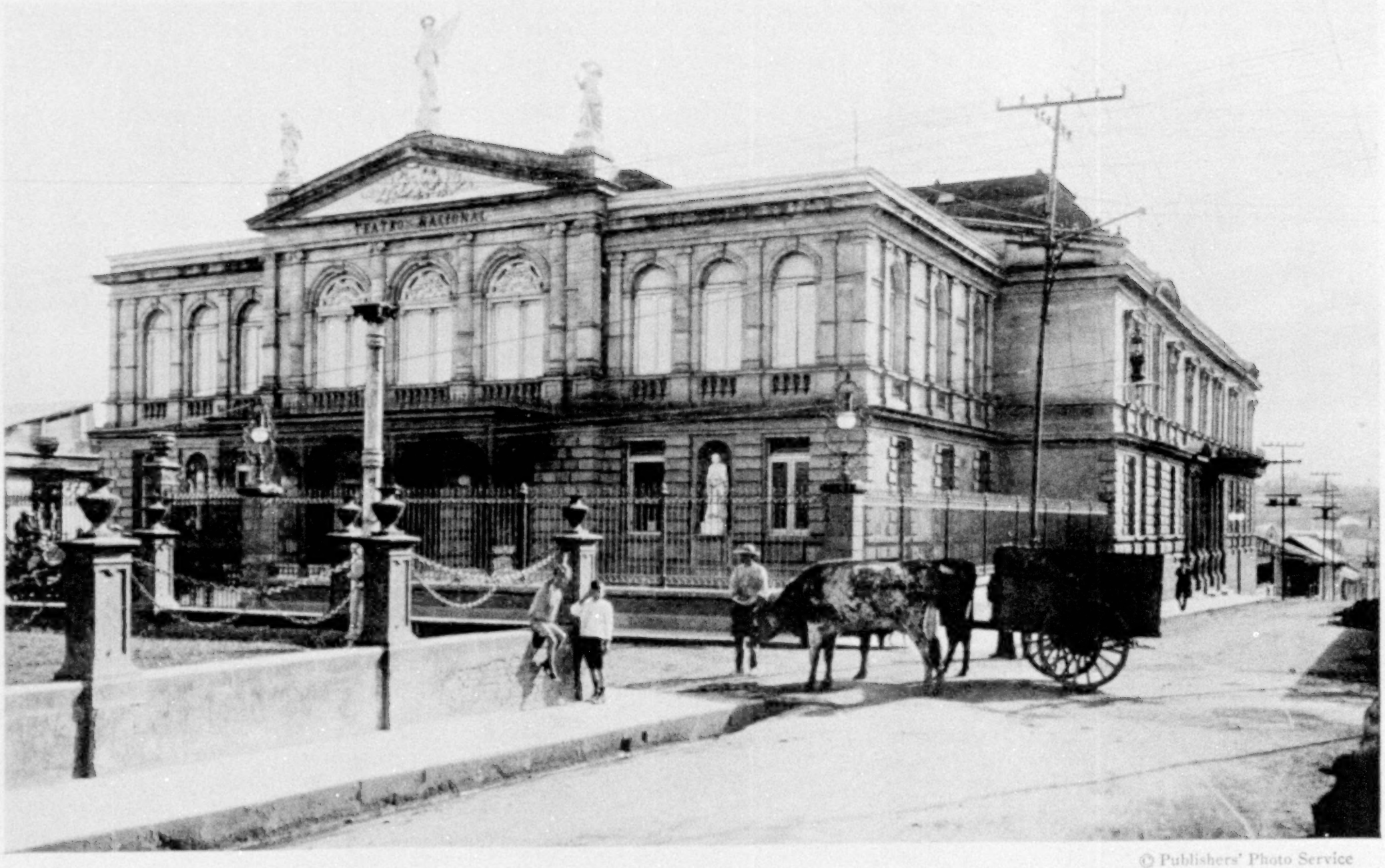
OX-CARTS IN THE STREETS OF SAN JOSÉ, COSTA RICA

In many parts of the country one may see mahogany wheels on these carts, and in some places cedar is more esteemed as a furniture-wood than mahogany. The heavy hauling of the republic is done with these carts (see text, page 220).

XUM



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SAN JOSÉ'S FAMOUS OPERA HOUSE, "THE FIFTH FINEST IN THE WORLD"

This magnificent structure, in a city of 50,000, including the suburbs, is seldom used more than once or twice a year, when a traveling troupe gives a performance. Here, however, is held the great annual fixed social event of the republic, the President's ball, on New Year's Eve.

Photograph by H. Wimmer

THE CACIQUE (CHIEF) OF THE TALAMANCA INDIANS IN FRONT OF HIS THATCH RESIDENCE: COSTA RICA

The Indian who wears this impressive title exerts nominal authority over the two small remaining tribes of the Talamancas, who were able, at the time of the Spanish conquest, to hold their territory against all invasions of the Conquistadores. It is said that they fought "with greater valor than any other nation of the Indies."

national opera house, which is said by its builders to be the fifth finest in the world, and is certainly far superior to anything New York could boast until very recently. It was erected by imported Italian skilled labor at a fantastic cost, and is a work of art inside and out; but there is no need for it, and it is a beautiful specimen of white elephant, used perhaps once or twice a year, when a traveling troupe visits the republic (see page 217).

Sometimes the handsome building is closed for a whole year, except for the one fixed event, the President's annual ball, which is the high-water mark of social life in the republic. It is held on New Year's eve, and establishes caste lines for the following year. Debutantes' programs are filled for months in advance, and woe to the young woman who is a wall flower at the President's ball!

The common people get pleasure even from a funeral, which they always turn into quite an event, with music and a general gathering of friends. The Costa Rican is a born music-lover, and almost any one who can get possession of an instrument is able to play by ear. Small country funerals are usually preceded merely by an accordion player, who squeezes out any tune that comes into his head, ignorant of the names of all. I witnessed one such cortege in a little mining village, marching to the inspiring strains which the American engineers had been whistling, "There'll Be a Hot Time in the Old Town Tonight."

The great religious festivals are, of course, marked by intense enthusiasm, Christmas being celebrated for the better part of a week. These festivals are usually notable for the good nature and good order of the crowds.

The people are essentially law-abiding and the standard of morality is in most respects high.

NATIVE LIFE IS BEST SEEN FROM HORSEBACK

One sees native life at its best by a horseback trip through the country, and there is every facility for making this, since it is the customary way of travel with all except those who are poor enough to walk.

Heavy baggage is sent ahead in an ox-cart, and the traveler rarely fails to find a hotel at night. He does not encounter much luxury in these village inns, but cleanliness is present to a reasonable degree, and the food, if not up to Parisian ideas, is nourishing.

If the traveler is in the neighborhood of a mining camp where there are North Americans, he is sure of a welcome and comfort; he is equally sure of the former, but not the latter, in any peon's hut.

The railway is invaluable for exporting freight, but the Pacific division has never been up to standard for passenger accommodation. When I lived on the west coast the service was so infrequent that it was the custom to hire a special train whenever one wanted to make a trip. This was not expensive and had the advantage that one could ride in the engineer's cab if he chose.

NO LONGER HOSTILE TO UNITED STATES

For many years subsequent to General Walker's filibustering invasion of Nicaragua, in 1856, there was a strong feeling of hostility toward the United States on the part of Costa Ricans. With two new generations, this has practically disappeared, and while there still exists in some quarters a little unfounded apprehension as to the political ambitions of the larger republic, it is gradually being eliminated, so it may be said without reserve that the Costa Ricans are on the whole distinctly friendly to our country.

This will not only encourage American capital to take advantage of some of the many opportunities which are offered there under a stable government, but it is each year leading a larger number of tourists, anxious to become better acquainted with their neighbors, to make the trip and enjoy it. Many of them are naturalists or nature-lovers, for whom the territory is a notably rich field, being the meeting ground of the flora and fauna of North and South America.

For a leisurely voyage, the Pacific route has some advantages, since the steamers stop at nearly all Central American ports and often occupy three weeks in the trip from San Francisco to Puntarenas. The more frequented route, however, is either from New York to Port Limon, 12 to 14 days, or from New Orleans to Port Limon, five to seven days.

XUM

Photograph by H. Wimmer

EXCELLENT PROSPECTS FOR SOUP

From the semi-tropical waters of Mexico, Central America, and the West Indies come highly prized turtles for the markets along our eastern coast.

From the port travelers go directly to the cool and healthy country about the capital, where there are good hotels and a colony of Englishmen and Americans.

Summer clothing is necessary, but overcoats and wraps for evening wear should not be omitted. Obviously, umbrellas and waterproofs are desirable for the rainy season; but dangerous storms are almost unknown.

Those who wish to spend the winter, which at San José is a most delightful season, may rent a good house, centrally located, at a nominal figure. Most of the residences are of one-story, in the typical Latin-American style, built of adobe and brick, with tile or galvanized iron roofs, around a courtyard or patio, where is a fountain, flowers, and shrubbery. Roses bloom the year around, and there is never a month when the lemon tree, a fixture in every patio, fails to yield its fruit for household use.

One buys all meat, vegetables, fruit, and kitchen supplies in the market, which is one of the most interesting sights of every city and a never-failing source of interest to newcomers. Saturday is the principal trading day, when country people come in with their little bundles of produce and the streets around the marketplace are jammed with ox-carts, which still do all the heavy hauling in the republic (see page 216). Living is cheap and good, except for meat, which is dear and tough.

With the increasing tide of travel and commerce constantly flowing back and forth, Costa Rica and the United States are coming to know each other better, and mutual respect is being increased by the acquaintance.

OUR MAP OF THE COUNTRIES OF THE CARIBBEAN

LOOKING southward from the shores of our Gulf States, the geographer surveys a group of ten republics of vast potentialities, clustered in and around two great warm seas. In addition to these independent republics, the waters of the Gulf of Mexico and the Caribbean Sea are dotted with innumerable tropical islands of riotous vegetation belonging to the United States, Great Britain, France, and the Netherlands.

These semi-inclosed seas have been aptly termed "The American Mediterranean," for, crisscrossing and meandering through the channels between the Gulf and Caribbean islands run the great ocean lines of an ever-increasing commerce.

No other region of the Western Hemisphere embraces so many geographical names of historic significance as that charted on the "Map of the Countries of the Caribbean," which is issued as a supplement to this number of the NATIONAL GEOGRAPHIC MAGAZINE.*

A REGION OF ROMANCE AND HISTORY

Here are place names which quicken the imagination and the romantic impulses of the most prosaic:

The first land of the New World sighted by Columbus on his epochal voyage of discovery was Watling Island, among the Bahamas, and on its sandy beach, on the morning of October 12, 1492, he knelt "to give thanks to God and kiss the ground with tears of joy for the great mercies received."

The first settlement in the New World was that established by Columbus in Santo Domingo, and the fort built for that colony was constructed from the hulk of his wrecked flagship, the *Santa Maria*.

The first permanent settlement within the bounds of what is now the United States was made by the Spaniards at St. Augustine, Florida, in 1565.

The foremost intellectual achievement of ancient America (see pages 109-130) was consummated in southern Mexico, Guatemala, and Honduras, and such ruins as those at Tical, Chichen Itza, Copan, and Quirigua continue to yield their fascinating secrets to explorers and archæologists.

It was from a height on the Isthmus of Darien that a European eye looking westward first caught a glimpse of the mighty "South Sea."

It is across the Isthmus of Panama that American genius for organization, sanitation, and mechanics has achieved the greatest engineering feat in the history of mankind—the Panama Canal.

The waters of Havana Harbor hold a sacred interest for America as the place of destruction of the martyred U. S. S. *Maine*.

In Caracas, the scene of his earliest efforts to free South America from the Spanish yoke, repose the ashes of the Great Liberator, Simon Bolivar.

Throughout the Greater and Lesser Antilles are countless harbors of refuge and lairs redolent with legends of the buccaneers of the Spanish Main (see pages 146-187).

LANDS OF PHENOMENAL AGRICULTURAL AND MINERAL WEALTH

As for material wealth, what other part of the globe can rival the cotton plantations of Mississippi, Louisiana, and Texas, the oil fields of Texas and Tampico, the sugar and tobacco lands of Cuba and Porto Rico, the banana plantations of Costa Rica, the sisal fields of Yucatan, the coffee groves of Salvador, the platinum and emerald mines of Colombia, or the asphalt lakes of Trinidad?

Only a few years ago the wealth, the beauty, the romance, and the historical remains of this vast region were shut off from northern civilization by the dread barriers of disease, and the inhabitants themselves were in constant peril of devastating epidemics. He who went

*Additional copies of the Countries of the Caribbean Map are obtainable from the headquarters of the National Geographic Society, Washington, D. C., at $1.00 each in paper, $1.50 in linen; maps in color of the New Europe (30 x 33 inches), Asia (28 x 36), South America (25 x 35), and Islands of the Pacific (19 x 25) at the same prices.

into the countries of the Caribbean not merely "took his life in his hands," but staked it upon the appetite of the yellow-fever-bearing mosquito.

Today, thanks to the genius and the sacrifices of American medical science, these lands are purged of such scourges and are as safe as our own climes (see text, page 140).

But even twentieth-century science bows to the meteorological forces which make of the Caribbean area the terrible "breeding ground" for the irresistible forces of the wind, for here originate the hurricanes which periodically loose their destroying strength upon plantation and settlement, upon puny man and his ships at sea, and sweep up our own Eastern and Gulf seaboards with devastating effect.

As if to make amends for releasing the Pandora curse of storms, however, Nature has also made this region the birthplace of that wonderful, beneficent warm-sea river, the Gulf Stream, which the late Admiral Pillsbury, formerly President of the National Geographic Society, appropriately called "the grandest and most mighty terrestrial phenomenon" (see also page 153).

AN AREA RICH IN INTEREST FOR THE STUDENT OF GOVERNMENT

To the political economist the republics to the south present a subject of absorbing study in the development of popular government. Some of the nations are still in a state of political flux. This is especially true of the newly formed Republic of Central America, composed of Guatemala, Honduras, and Salvador and, prospectively, of Nicaragua and Costa Rica.

The recent revolution in Guatemala has given the proponents of the union a temporary setback, but the most earnest friends of Latin America are confident that in such a union is the ultimate solution of a stable state, of economic administration, and of gratifying commercial and social advancement.

The constitution of the republic was signed by Guatemala, Salvador, and Honduras in September, 1921, and became effective on the first of the following month.

According to the plans at this writing, the permanent government is to be established this month (February 1, 1922). It is to be republican in form and will consist of three branches—the executive, legislative, and judicial.

THE MAP REPRESENTS MANY MONTHS OF RESEARCH

In few parts of the world has less been accomplished in accurate surveying than in certain portions of Central and South America.

In the compilation of data for the "Map of the Countries of the Caribbean," therefore, it was necessary to investigate and verify many sources of information. In this work the National Geographic Society's cartographers and research experts had the cordial coöperation of United States Government departments in Washington, of which the Hydrographic Office of the Navy and the Graphic Section of the General Staff, War Department, were especially fruitful sources. In addition, the several legations of Central American countries gave valuable assistance.

For data on specific points, The Society is indebted to numerous explorers and geographers, who have from time to time been contributors to the NATIONAL GEOGRAPHIC MAGAZINE, and who were able to give first-hand information concerning railroads recently built and in the course of construction and others which have been abandoned.

The resultant map, it is confidently believed, affords the most concise and accurate information obtainable on this part of the world.

The issuance of the "Map of the Countries of the Caribbean" as a supplement with the February GEOGRAPHIC is in continuance of The Society's map program begun in 1921, when large scale maps in colors were compiled and issued of the New Europe, Asia, South America, and the Islands of the Pacific.

Later in 1922 generous scale Maps of Africa and of the World, on which work has been progressing for two years, will be issued.

A
115°
B
110°
1
2
30°
25°
CALIFORNIA
San Diego
ARIZONA
Phoenix
Mesa
Tempe
Maricopa
Roosevelt
Miami
Globe
San Carlos
Gila Bend
Florence
Hayden
Ajo
Aztec
Yuma
Tucson
Sahuarita
Twin Buttes
Benson
Fairbank
Tombstone
Bisbee
Nogales
Naco
Cochise
Pearce
Kelton
Bowie
Fort Huachuca
SONORA
Hermosillo
Guaymas
Magdalena
Nacozari
Arizpe
Altar
Libertad
Tepoca
Carmen
Torres
Moreno
Ures
Medano
Santa Rosalia
BAJA CALIFORNIA
Ensenada de Todos Santos
C.San Quintin
B. San Quintin
I.S.Martin
I.S.Jeronimo
P.Baja
C.S.Agustin
I.Natividad
P.S.Eugenia
Is.Benita
Cedros
Bahia de Sebastian Viscaino
I.Roque
I.Angel de la Guarda
I.Tiburon
I.S.Luis
I.Link
C.Lobos
C.Virgenes
I.Tortuga
I.S.Marcos
I.Lobos
I.Coronados
I.Carmen
I.Monserrate
I.Sta.Catalina
I.Sta.Cruz
I.Magdalena
C.S.Lazaro
Magdalena Bay
I.S.Jose
Mulege
P.Ahome
Topolobampo
I.Macapule
I.Saliaca
I.Altamura
P

110°
C
105°
D
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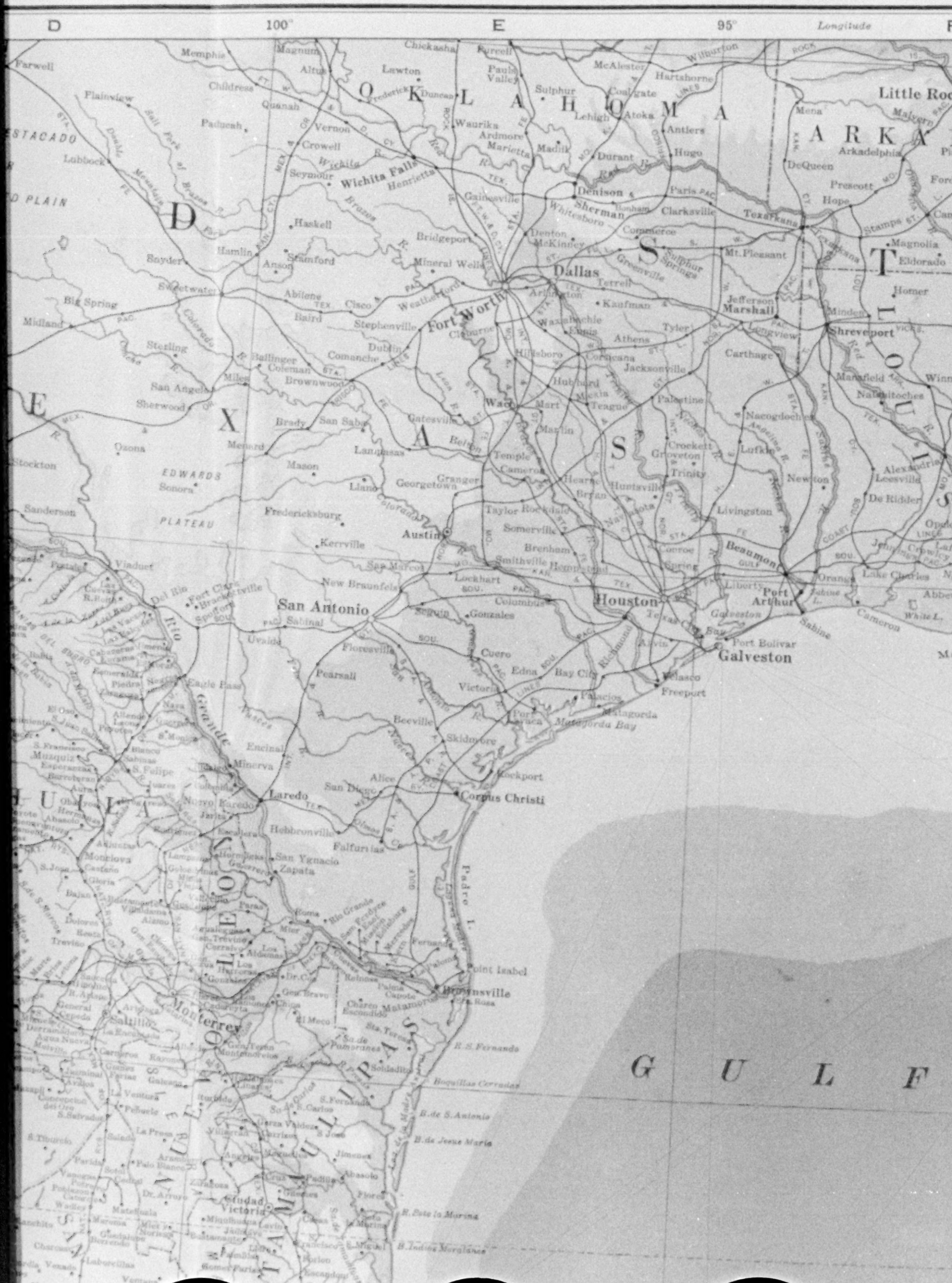
NEW MEXICO
TEXAS
CHIHUAHUA
COAHUILA
SIERRA MADRE OCCIDENTAL
LLANO ESTACADO OR STAKED PLAIN
GUADALUPE MOUNTAINS
SAN ANDRES RANGE
SANTIAGO MTS.
EDWARDS PLATEAU
LLANO DE LOS CRISTIANOS
LLANO DE LOS GIGANTES
BOLSON DE MAPIMI
Rio Grande
Pecos R.
Colorado R.
Sierra Blanca Pk.
Magdalena
Socorro
San Marcial
Hillsboro
Silver City
Rincon
Lordsburg
Deming
Las Cruces
Tularosa
Alamogordo
Lincoln
Roswell
Hagerman
Artesia
Hope
Carlsbad
Texico
Farwell
Clovis
Portales
Hachita
Hermanas
Columbus
Clifton
Morenci
Safford
Fort Bliss
El Paso
Juarez
Ysleta
Sierra Blanca
Pecos
Barstow
Fort Davis
Marfa
Alpine
Ft. Stockton
Sanderson
Presidio
Ojinaga
Plainview
Lubbock
Memphis
Childress
Paducah
Snyder
Hamlin
Big Spring
Midland
Sweetwater
Sterling
San Angelo
Sherwood
Ballinger
Ozona
Sonora
Menard
Del Rio
Fort Clark
Brackettville
Viaduct
Eagle Pass
Uvalde
Encinal
Laredo
Nuevo Laredo
Chihuahua
Parral
Jimenez
Camargo
Monclova
Sabinas
Muzquiz
Monterrey
Saltillo
Lerdo
Gomez Palacio
Mapimi
Sierra Mojada
Casas Grandes
Nuevo Casas Grandes
La Ascencion
Guzman
Namiquipa
Guerrero
Ocampo
Sinaloa
Topia
Tepehuanes



D
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E
95°
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Denison
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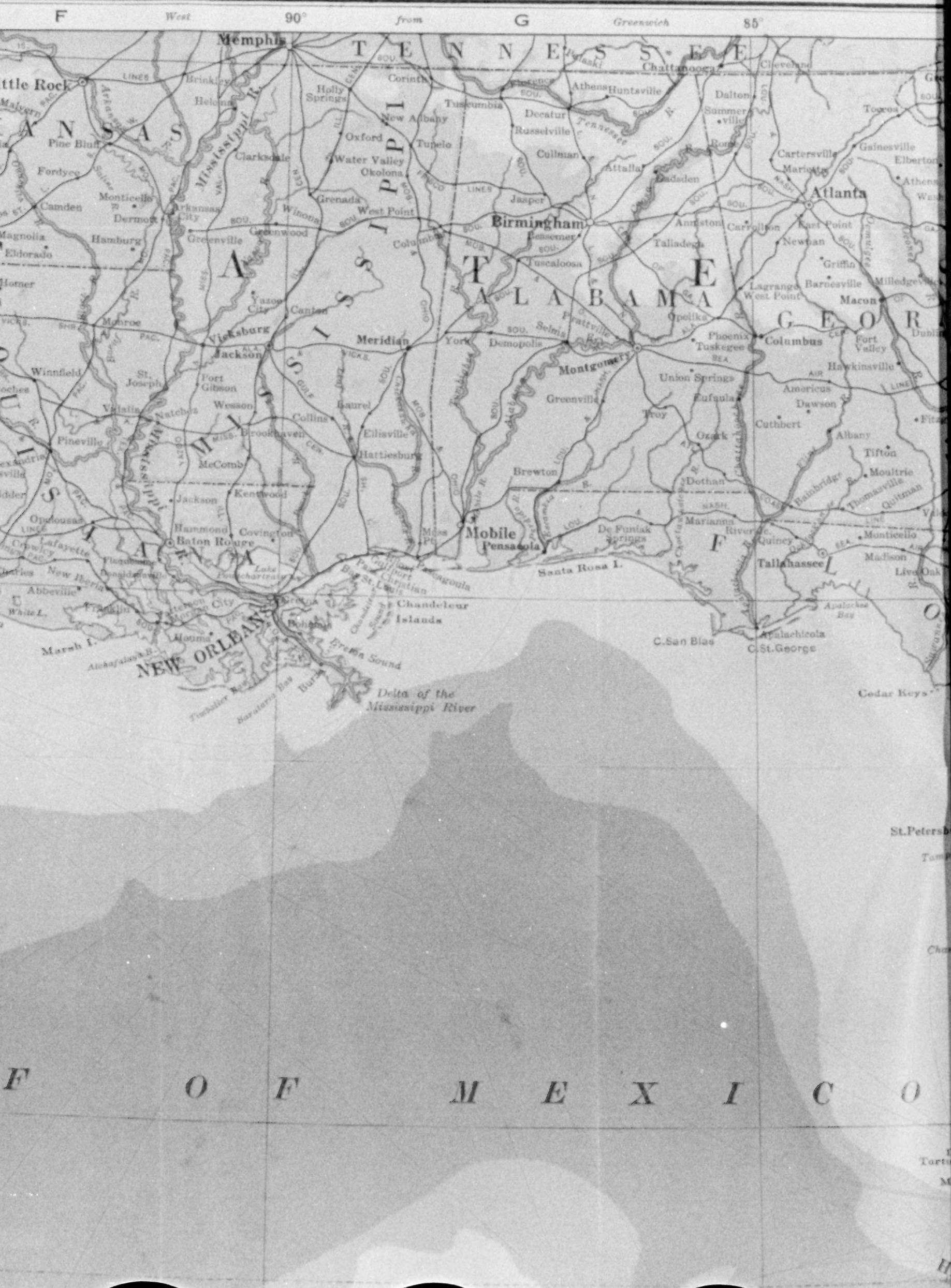
Dallas
Fort Worth
Marshall
Shreveport
Waco
Austin
San Antonio
Houston
Galveston
Port Arthur
Beaumont
Corpus Christi
Laredo
Brownsville
Monterrey
Saltillo
Ciudad Victoria
G U L F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West
90°
from
G
Greenwich
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Memphis
TENNESSEE
Chattanooga
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Little Rock
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Holly Springs
Corinth
Tuscumbia
Florence
Athens
Huntsville
Dalton
Summerville
Toccoa
Decatur
Russelville
Tennessee
Rome
Gainesville
Elberton
Pine Bluff
Fordyce
Clarksdale
Oxford
New Albany
Tupelo
Water Valley
Okolona
Cullman
Attalla
Gadsden
Cartersville
Marietta
Atlanta
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Monticello
Dermott
Arkansas City
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West Point
Jasper
Birmingham
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Anniston
Carrollton
East Point
Newnan
Magnolia
Eldorado
Hamburg
Greenville
Greenwood
Columbus
Talladega
Tuscaloosa
Griffin
Barnesville
Milledgeville
Homer
Yazoo City
Canton
Lagrange
West Point
Macon
Monroe
Vicksburg
Jackson
Meridian
York
Demopolis
Selma
Prattville
Opelika
Phoenix
Tuskegee
Columbus
Fort Valley
Dublin
Winnfield
St. Joseph
Port Gibson
Montgomery
Union Springs
Hawkinsville
Americus
Dawson
Vidalia
Natchez
Wesson
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Laurel
Greenville
Eufaula
Troy
Cuthbert
Pineville
Brookhaven
Ellisville
Ozark
Albany
Tifton
McComb
Hattiesburg
Brewton
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Moultrie
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Covington
Baton Rouge
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Pensacola
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Marianna
River Jc.
Quincy
Monticello
Madison
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Tallahassee
Lafayette
Crowley
Flaquemine
Donaldsonville
Lake Pontchartrain
Pascagoula
Santa Rosa I.
Abbeville
New Iberia
Franklin
Morgan City
Houma
Gretna
Bohemia
Chandeleur Islands
Apalachee Bay
Apalachicola
C. San Blas
C. St. George
Marsh I.
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Cedar Keys
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GULF OF MEXICO

Memphis
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New Albany
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Tupelo
Water Valley
Okolona
Grenada
Winona
West Point
Greenwood
Yazoo City
Canton
Meridian
Laurel
Collins
Ellisville
Hattiesburg
Brookhaven
Brewton
Mobile
Pensacola
Mobile Pt.
Pass Christian
Gulfport
Biloxi
St. Louis
Bay St. Louis
Pascagoula
Chandeleur Islands
Bohemia
Breton Sound
Delta of the Mississippi River
Florence
Chattanooga
Cleveland
Athens
Huntsville
Decatur
Russelville
Tennessee R.
Dalton
Summerville
Rome
Cullman
Attalla
Gadsden
Jasper
Birmingham
Bessemer
Anniston
Talladega
Tuscaloosa
Selma
Demopolis
York
Montgomery
Prattville
Opelika
Phoenix
Tuskegee
Columbus
Union Springs
Eufaula
Greenville
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Santa Rosa I.
C. San Blas
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Apalachee Bay
Cartersville
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Carrollton
East Point
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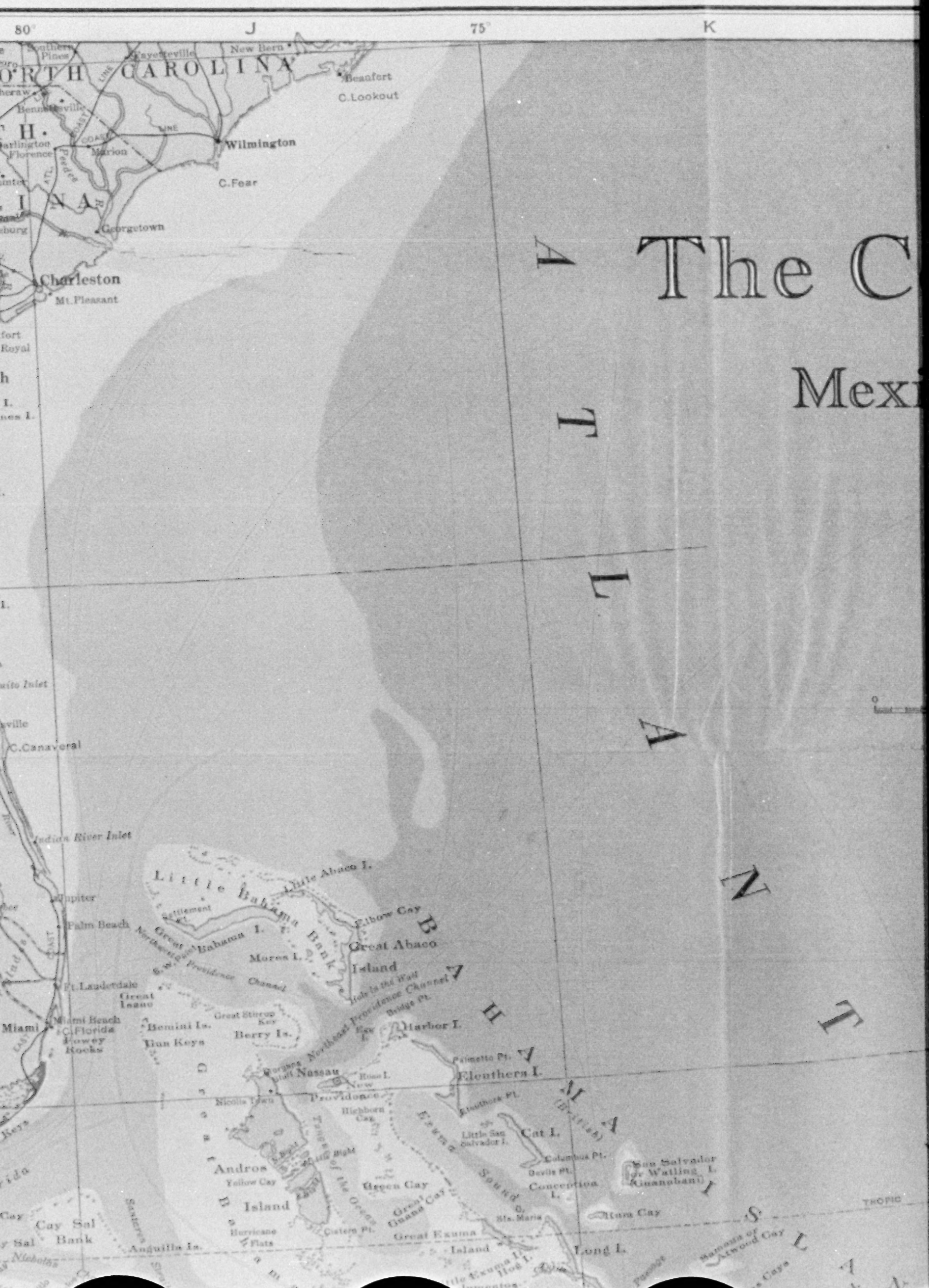
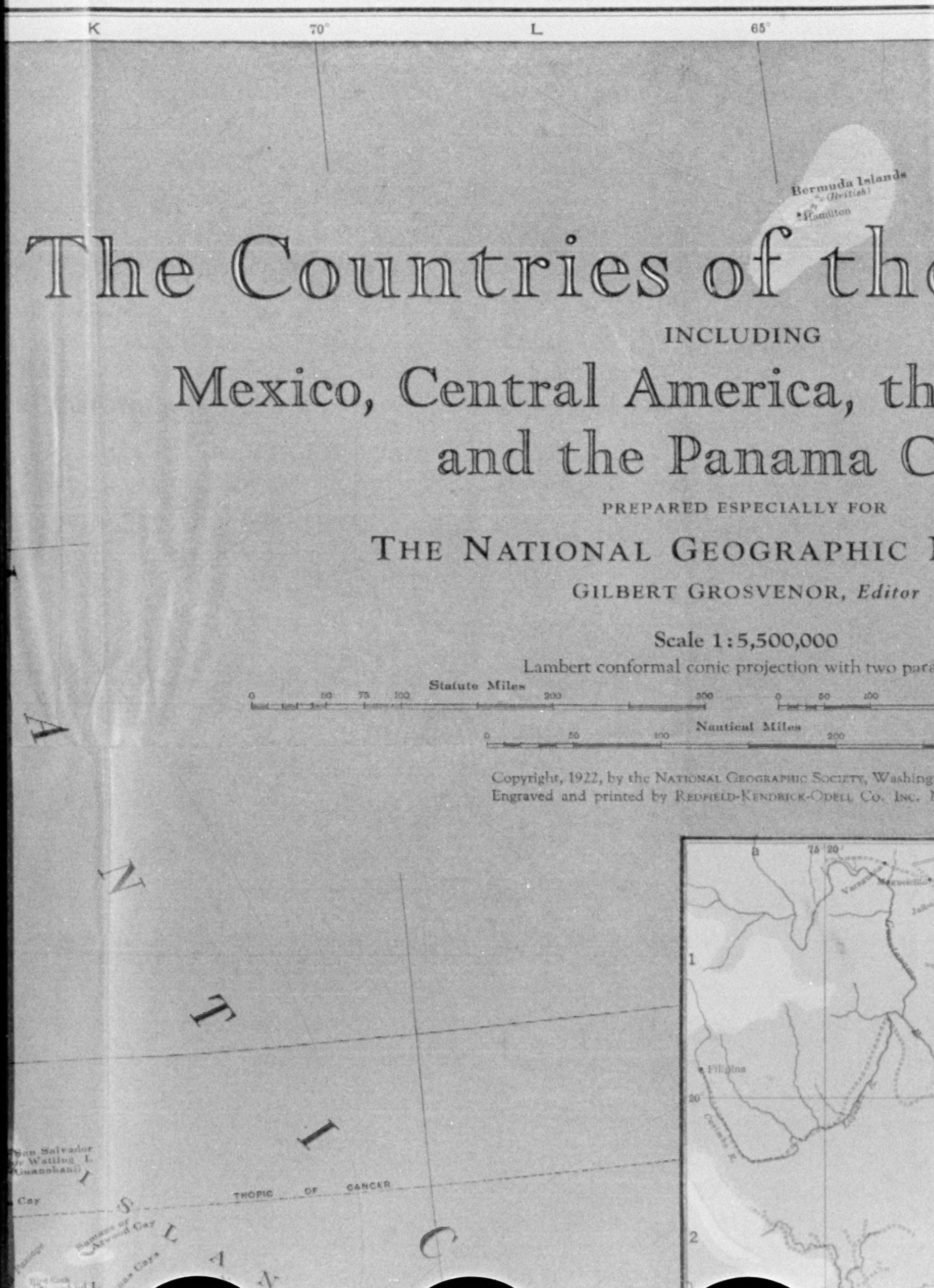
Griffin
Barnesville
Lagrange
West Point
Macon
Fort Valley
Hawkinsville
Americus
Dawson
Cuthbert
Albany
Fitzgerald
Tifton
Douglas
Waycross
Moultrie
Thomasville
Bainbridge
Quitman
Valdosta
Folkston
Dupont
Quincy
Monticello
Madison
Tallahassee
Live Oak
Lake City
Jasper
Fernandina
Jacksonville
St. Johns R.
Gainesville
Palatka
Green Cove Springs
St. Augustine
Anastasia I.
Daytona
Mosquito Inlet
Ocala
Cedar Keys
De Land
Sanford
Orlando
L. Apopka
Kissimmee
L. Kissimmee
Tampa
Bartow
St. Petersburg
Fort Tampa
Tampa Bay
Bradentown
Arcadia
Lake Okeechobee
Charlotte Harbor
Fort Myers
Punta Rasa
Big Cypress Swamp
C. Romano
Ten Thousand Islands
Everglades
Miami
C. Sable
Big Pine Key
Sugar Loaf Key
Boca Chica
Florida Bay
Florida Keys
Dry Tortugas
Marquesas Keys
Key West
Straits of Florida
N. Elbow Cay
Cay Sal
Nicholas
Greenville
Easley
Spartanburg
Rock Hill
Monroe
Chester
Laurens
Anderson
Greenwood
Newberry
Columbia
Sumter
Charlotte
Gastonia
Gaffney
Wadesboro
Cheraw
Darlington
Florence
Toccoa
Elberton
Abbeville
Athens
Washington
Augusta
Aiken
Orangeburg
Bamberg
Summerville
Beaufort
Port Royal
Savannah
Ossabaw I.
St. Catherines I.
Sapelo I.
St. Simon I.
Brunswick
Jekyl I.
Cumberland I.
Helena
Statesboro
Dublin
Chattahoochee R.
Flint R.
Ocmulgee R.
Oconee R.
Savannah R.
Pearl R.
Yazoo R.
Tombigbee R.
Alabama R.
Coosa R.
Tallapoosa R.
Chattahoochee R.
Apalachicola R.
Escambia R.
Blackwater R.
Yellow R.
Perdido R.
Pascagoula R.
Big Black R.
Tallahatchie R.
Yalobusha R.
Tennessee R.
Cumberland R.
Ohio R.
Mississippi R.
Arkansas R.
Red R.
Gulf Coast
East Coast
Florida Keys
Bahama Islands



80°
J
75°
K
Southern Pines
Fayetteville
New Bern
NORTH CAROLINA
Beaufort
C.Lookout
Bennettsville
Wilmington
Marion
Florence
C.Fear
Georgetown
Charleston
Mt.Pleasant
Royal
C.Canaveral
Indian River Inlet
Jupiter
Palm Beach
Ft.Lauderdale
Miami
Miami Beach
C.Florida
Fowey Rocks
Little Bahama Bank
Little Abaco I.
Elbow Cay
Great Abaco Island
Great Bahama I.
Mores I.
Northeast Providence Channel
Great Isaac
Bemini Is.
Gun Keys
Berry Is.
Harbor I.
Nassau
Eleuthera I.
Nicolls Town
New Providence
Highborn Cay
Little San Salvador I.
Cat I.
Columbus Pt.
Devils Pt.
Conception I.
San Salvador or Watling I. (Guanahani)
Andros Island
Yellow Cay
Green Cay
Great Guana Cay
Sta. Maria
Rum Cay
Cay Sal Bank
Anguilla Is.
Hurricane Flats
Cistern Pt.
Great Exuma Island
Long I.
Samana or Atwood Cay
BAHAMA ISLAND
ATLANTIC
The C
Mexi


K
70°
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65°
Bermuda Islands
(British)
Hamilton
The Countries of the
INCLUDING
Mexico, Central America, th
and the Panama C
PREPARED ESPECIALLY FOR
THE NATIONAL GEOGRAPHIC
GILBERT GROSVENOR, Editor
Scale 1:5,500,000
Lambert conformal conic projection with two para
Statute Miles
0 50 75 100 200 300
0 50 100
Nautical Miles
0 50 100 200
Copyright, 1922, by the NATIONAL GEOGRAPHIC SOCIETY, Washing
Engraved and printed by REDFIELD-KENDRICK-ODELL CO. INC.
A N T I C
San Salvador
Watling I.
Guanahani)
Cay
THOPIC OF CANCER
Sumner or Atwood Cay
Filipina
Cusimba R.
1
2
20°
75 20°

M
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N
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the West Indies
Canal
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Kilometers
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500
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Washington, D. C.
Inc. New York
1
30°
2
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3
75°
74° 50'
20'
b
c
d
Guantanamo
San Rafael
Santa Isabel
Arroyo Hondo
Paradero
Guajana
Manati
Pt. Negra
Glorietta
Joa. Bay
Pt. Manati
Pt. Serrunes
Caimanera
Boqueron
UNITED STATES
NAVAL STATION
U. S. Naval Air Station
Radio Station
GUANTANAMO
BAY, CUBA
United States Naval Base

I.Magdalena
C.S.Lazaro
Magdalena Bay
I.Sta.Margarita
I.Creciente
I.Sta.Cruz
I.S.Jose
I.Espiritu Santo
La Paz
I.Cerralvo
P.Arena
Todos Santos
P. Tinaja
Cabo Falso
C.S.Lucas
S.Jose del Cabo
Topolobampo
I.S.Ignacio
I.Macapule
I.Saliaca
I.Altamura
TROPIC OF CANCER
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F
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I.S.Benedicto
Roca Partida
Revilla Gigedo Islands
I.Socorro
3
20°
4
15°
5
a
b
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d
New Porto Bello
Ruins of Porto Bello
ATLANTIC OCEAN
CARIBBEAN SEA
Naranjos Cays
Galeta I.
Toro Pt.
COLON
Cristobal
Limon Bay
Mt.Hope
Chagres
Gatun Dam
Puerto Real
Santa Rita Mt.
Pina
Rio Pina
Lagarto
San Juan
Tranquilla
El Vigia
Maria Chiquita
Rio Grande
Cerro Brujo

D U R A N G O
Durango
Culiacan
Mazatlan
Z A C A T E C A S
Zacatecas
S. Luis Potosi
S A N L U I S P O T O S I
Aguascalientes
AGUASCALIENTES
Tepic
Guadalajara
J A L I S C O
Leon
Guanajuato
G U A N A J U A T O
Queretaro
Q U E R E T A R O
H I D A L G O
Pachuca
Morelia
M I C H O A C A N
C O L I M A
Colima
Manzanillo
Toluca
M E X I C O
Cuernavaca
Taxco
G U E R R E R O
Chilpancingo
Acapulco
Monterrey
Saltillo
Torreon
Ciudad Victoria
Maria Madre I.
Las Tres Marias
Maria Magdalena I.
Maria Cleofas I.
I. Tres Marietas
B. Banderas
C. Corrientes
S. Blas
O
C
E
A
Chagres

Point Isabel
Brownsville
Matamoros
Monterrey
Saltillo
Ciudad Victoria
Tampico
S.Luis Potosi
Laguna de Tamiahua
C.Rojo
Lobos I.
Tamiahua
Tuxpan
Tecolutla
Pachuca
Tlaxcala
Puebla
Jalapa
Vera Cruz
Orizaba
Cordoba
Huautla
Oaxaca
Tehuantepec
Isthmus of Tehuantepec
Gulf of Tehuantepec
Salina Cruz
Tuxtla
Villa Hermosa
Puerto Mexico
Acapulco
Chilpancingo
Cuernavaca
Morelia
Guanajuato
Leon
Mexico
Toluca
Juquila
Mixtepec
Pto. Angel
I. Sacrificios
Huatulco
Jimenez
Padilla
Abasolo
Soldadito
Boquillas Cerradas
B. de S. Antonio
B. de Jesus Maria
R. Soto la Marina
B. Indios Moralanes
B. del Tordo
B. de Trinidad
B. Ciega
R. S. Fernando
P. Piedras
P. de la Mancha
P. de Zempoala
Antigua
Tlacotalpan
Cosamaloapan
Santiago Tuxtla
Minatitlan
Coatzacoalcos
Jalapa
Orizaba
Cordoba
Tlaxcala
Puebla
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Tehuantepec
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Jalapa
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Cordoba
Huautla
Oaxaca
Tehuantepec
Isthmus of Tehuantepec
Gulf of Tehuantepec
Salina Cruz
Tuxtla
Villa Hermosa
Puerto Mexico
Acapulco
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B. del Tordo
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R. S. Fernando
P. Piedras
P. de la Mancha
P. de Zempoala
Antigua
Tlacotalpan
Cosamaloapan
Santiago Tuxtla
Minatitlan
Coatzacoalcos
GULF
BAY OF CAMP
REPUBLIC
OF

F O F M E X I C O
Alacran Reef
Cayo Arenas
Cayo Nuevo
Bank of Campeche
The Triangles
Cayo Areas
Strait of Yucatan
C. San Antonio
Colorado Reefs
Guadiana Bay
C. Corrientes
C. Catoche
I. Contoy
I. Blanca
I. Mujeres
I. Cancum
I. Cozumel
Progreso
Merida
Izamal
Valladolid
Chichen Itza
Ticul
Tekax
Peto
Tizimin
Espita
Tunkas
Tulum
YUCATAN
Yucatan
QUINTANA ROO
Peninsula
Santa Cruz de Bravo
Campeche
CAMPECHE
Champoton
Laguna de Terminos
I. del Carmen
Bacalar
Payo Obispo
Banco Chinchorro
Cayo Arenas
Xkalak
BRITISH HONDURAS
Belize
Turneffe
Northern Cays
Long Cay
Stann Creek
Glover Reef
Swan Is.
Islas de la Bahia
I. Roatan
I. Utila
Gulf of Honduras
Livingston
Pto. Barrios
Pto. Cortes
Trujillo
C. Camaron
Flores
GUATEMALA
Coban
S. Pedro Sula
Quezaltenango
Totonicapan
Guatemala
HONDURAS
Comayagua
Tegucigalpa
La Esperanza
Sta. Rosa
Nacaome
SALVADOR
Salvador
OF CENTRAL
CHIAPAS
Comitan
S. Cristobal
Palenque
Frontera

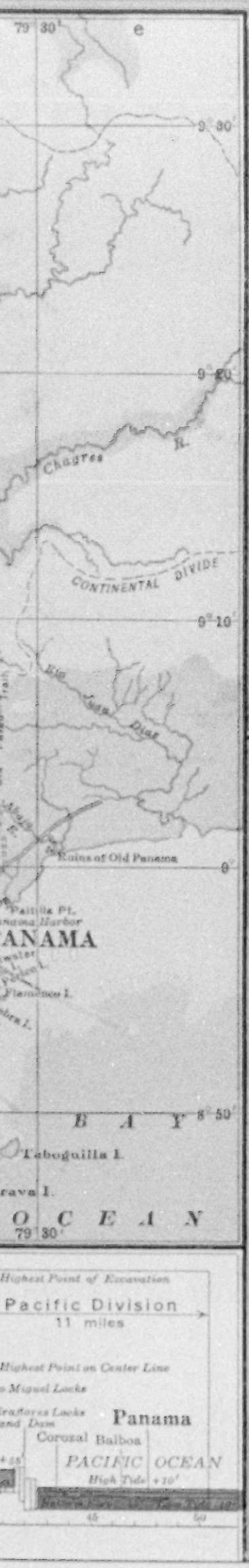
M E X I C O
Charlotte Harbor
Fort Myers
Punta Rasa
Big Cypress Swamp
The Everglades
C.Romano
Ten Thousand Islands
Miami
C.Sable
Florida Bay
Big Pine Key
Sugar Loaf Key
Boca Chica
Florida Keys
Dry Tortugas
Marquesas Keys
Key West
Straits of Florida
N.Elbow Cay
Cay Sal
HAVANA
Matanzas
Cardenas
Colorado Reefs
Pinar del Rio
Guadiana Bay
Cayos de San Felipe
C.Frances
Nueva Gerona
Isle of Pines
Pta.Frances
Zapata Pen.
Cienfuegos
Trinidad
Cayo Largo
Cayo Rosario
Cayo Cantiles
Alacran Reef
Strait of Yucatan
C.San Antonio
C.Corrientes
Holbox
C.Catoche
I.Contoy
I.Blanca
I.Mujeres
I.Cancum
La Maroma
Tizimin
Valladolid
Chichen Itza
Tekax
Tulum
El Zarral
I.Cozumel
Vigia Chico
QUINTANA
Santa Cruz de Bravo
Peninsula
ROO
Chetumal
Banco Chinchorro
Cayo Arenas
BRITISH HONDURAS
S.Pedro
St.George's Cay
Belize
Turneffe
Northern Cays
Long Cay
Stann Creek
Glover Reef
Cockscomb Mts.
All Pines
Gulf of Honduras
Livingston
G R E
Pickle Bank
Little Cayman
North Sound
Georgetown
Grand Cayman
Bartlett
Misteriosa Bank
Swan Is.
Thunder Knoll
Guanaja
Islas de la Bahia
Barbareta
I.Roatan
I.Utila
Pto.Cortes
Pto.Barrios
Trujillo
C.Camaron
Seal Cays
Vivorilla Cays
Caxones or Hobbies
Gorda Cays
Cocorocuma Reef
Caratasca
C.Falso
Half Moon Reef
C.Gracias á Dios
Gracias á Dios
S.Pedro Sula
Progreso
Olanchito
Sta.Maria
San Esteban
H O N D U R A S
Sta.Rosa
Comayagua
La Esperanza
Tegucigalpa
Catacamas
Juticalpa
Nacaome
Sandy River
Mosquito Cays
Karata Lagoon
Quita Sueño Bank
Old Providence (Colombia)
Prinzapolca
Matagalpa

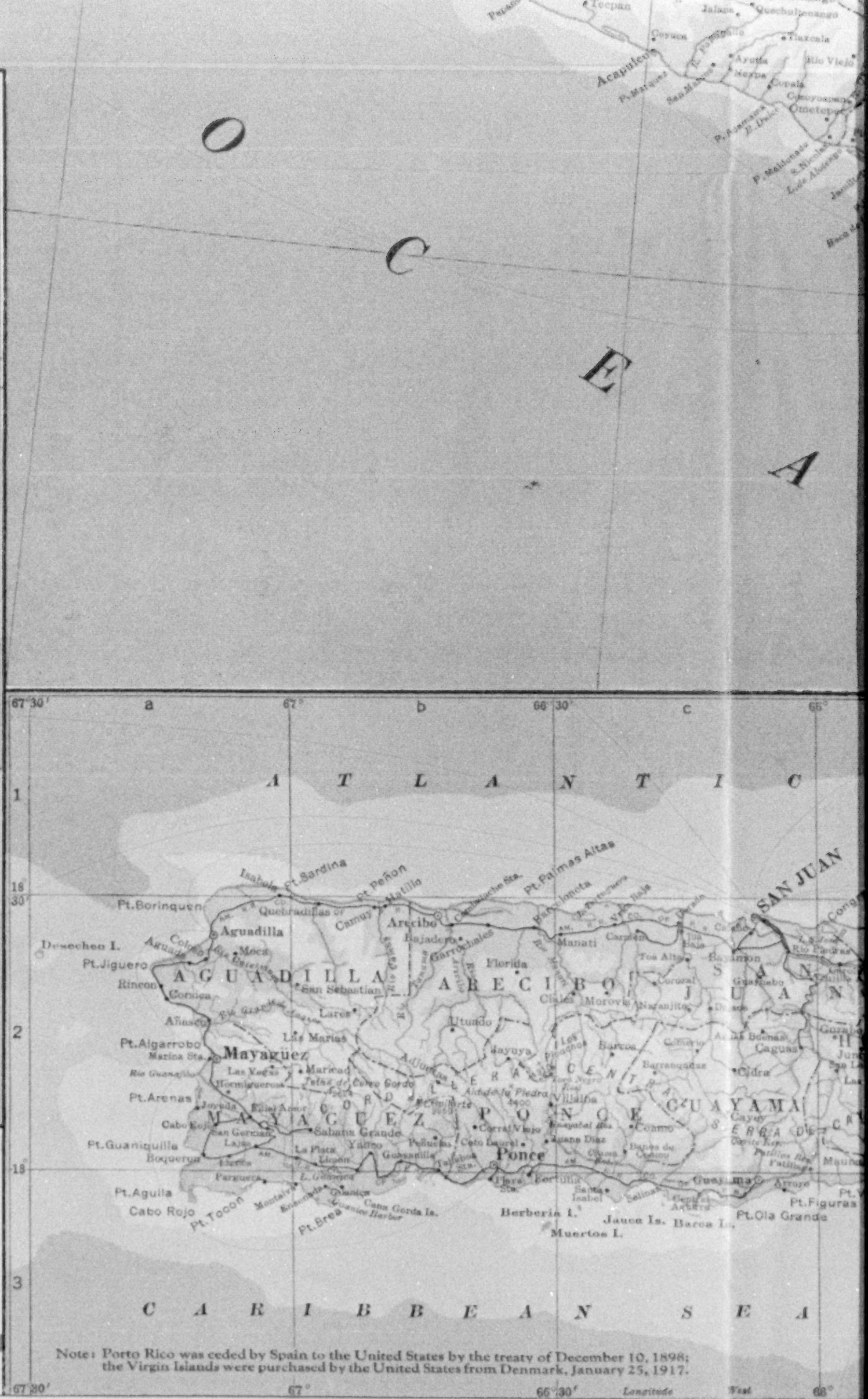
Palm Beach
Great Abaco Island
Moores I.
Ft. Lauderdale
Great Isaac
Miami Beach
C. Florida
Fowey Rocks
Bemini Is.
Gun Keys
Great Stirrup Key
Berry Is.
Harbor I.
Northeast Providence Channel
Nassau
New Providence
Eleuthera I.
Nicolls Town
Cat I.
Andros
Yellow Cay
Island
Exuma Sound
Little San Salvador I.
Columbus Pt.
Conception I.
San Salvador or Watling I. (Guanahani)
Green Cay
Great Guana Cay
Rum Cay
Cay Sal Bank
Great Bahama Bank
Hurricane Flats
Great Exuma Island
Long I.
Little Exuma I.
Hog I.
Jumentos Cays
Samana or Atwood Cay
Plana Cays
Anguilla Is.
TROPIC OF
Santa Clara
Crooked I.
Bird Rock
C. Verde
Fortune I.
Mariguana I.
Seal Cay
Racoon Cay
Acklin I.
Castle I.
Great Ragged I.
Cochinos Bank
Lobos Cay
Cayo Cruz
Columbus Bank
Cay Verde
Miraporvus
Hogsty Reef
Kansas Bank
Little Inagua I.
Great Inagua I.
Mathew Town
Sto. Domingo Cay
West Caicos
Caicos Bank
Ambergris Cay
Providenciales I.
North Caicos
Grand Caicos
Cienfuegos
Trinidad
Sancti Spiritus
Camaguey
Nuevitas
Holguin
Banes
Antilla
Manzanillo
ORIENTE
Baracoa
C. Maisi
Windward Passage
Tortuga I.
Cap Haitien
Port de Paix
Le Mole
C. à Foux
Jamaica
Guantanamo
Santiago de Cuba
SIERRA MAESTRA
Cayo Grande
Cayo Piedras
Cayo Caba Bones
Laberinto de Doce Leguas
Sta. Cruz del Sur
C. Cruz
Turquino Peak
Cayman Brac
Cayman
Bartlett Deep
Gonaives
Gonave I.
St. Marc
Mirebalais
Port-au-Prince
Jacmel
Cayemites I.
Jeremie
C. Dame Marie
Tiburon
C. Tiburon
Aux Cayes
Vache I.
Navassa I.
Formigas Bank
JAMAICA (British)
Montego Bay
Falmouth
St. Ann's Bay
Port Maria
Annotto Bay
Port Antonio
Green Island
South Negril Pt.
Lucea
Savanna la Mar
Black R.
Spanish Town
Kingston
Port Royal
Morant Pt.
BLUE MTS.
Gt. Pedro Bluff
Portland Pt.
Old Harbour Bay
Albatross Bank
Morant Cays
Pedro Bank
Portland Rock
Pedro Cays
Rosalind Bank
Alice Shoal
Bajo Nuevo
Serranilla Bank
North Cay
Serrana Bank
Roncador Bank
Alta Vela
C. Falso
C A R I B B E
A N T

TROPIC OF CANCER
San Salvador or Watling I. (Guanahani)
Crooked I.
Acklin I.
Castle I.
Mira por vos
Hogsty Reef
Little Inagua I.
Mathew Town
Caicos Bank
Providenciales I.
North Caicos
Grand Caicos
East Caicos
Grand Turk
Turks Island Passage
Salt Cay
Ambergris Cay
Endymion Rock
Mouchoir Passage
Mouchoir Bank
Silver Bank
Silver Bank Passage
Navidad Bank
Tortuga I.
Cap Haitien
Pto. Plata
Santiago de los Caballeros
Moca
La Vega
Samana Bay
DOMINICAN REPUBLIC
Santo Domingo
S. Pedro de Macoris
Saona I.
P. Engaño
Mona I.
Mona Passage
Desecheo I.
Mayaguez
San Juan
Ponce
PORTO RICO (United States)
Port-au-Prince
Jacmel
Jeremie
HAITI
C. Beata
Beata I.
Alta Vela
C. Rojo
Windward Passage
A N T I L L E S
C A R I B B E A N S
I. Aruba
I. Curaçao
I. Bonaire
Filipina
Murillo Chico
75° 20'
Longitude
O

GUANTANAMO BAY, CUBA
United States Naval Base
Statute Miles
Kilometers
UNITED STATES NAVAL STATION
Calmanera
Boqueron
Joa Bay
Guantanamo Bay
Port Escondido
Guajana
Leeward Pt.
Windward Pt.
U.S. Naval Air Station
Radio Station
West
from
Greenwich
75° 10'
75°
74° 50'
20
3
4
5
15
CEAN
A
LESSER ANTILLES
LEEWARD ISLANDS
WINDWARD ISLANDS
Sombrero
Dog I.
Anguilla (Br.)
St. Martin (Fr. & Du.)
Philipsburg
S. Bartholomew (Fr.)
Barbuda (Br.)
Codrington
Saba (Dutch)
St. Eustatius (Du.)
Oranjestad
St. Christopher (Br.) (St. Kitts)
Saba Bank
Basseterre
Nevis (Br.)
Charlestown
St. Johns
Antigua (Br.)
Falmouth
Redonda
Montserrat (Br.)
Plymouth
Anegada Channel
St. Thomas I.
St. John I.
Santa Cruz I. (St. Croix)
Frederiksted
Grand Terre
Désirade
Petite Terre
Guadeloupe (Fr.)
Marie Galante (Fr.)
Saintes Is.
Aves or Bird I.
Portsmouth
Dominica (Br.)
Roseau
Mt. Pelée
Martinique (Fr.)
St. Pierre
Diamond Rock
North C.
Port Castries
St. Lucia (Br.)
Soufriere Bay
C. Moulachique
St. Vincent (Br.)
Soufriere
Georgetown
Kingstown
Barbados (Br.)
Bridgetown
North Pt.
South Pt.
Bequia I.
Mustique I.
Canouan I.
Union I.
Carriacou
Ronde I.
Grenadines (Br.)
Grenada (Br.)
St. George
La Blanquilla
Los Hermanos
Tobago (Br.)
Little Tobago

THE PANAMA CANAL AND THE CANAL ZONE





105° D 100° E

XUM

Acapulco
Oaxaca
O A X A C A
Isthmus of
Tehuantepec
Tuxtla
Chiapa
C H I A
Comitan
Tehuantepec
Salina Cruz
Gulf of Tehuantepec
Juquila
Mihuatlan
Ejutla
Tlacolula
Tlaxiaco
Ometepec
E
A
N
REPUBLIC
OF
N T I C O C E A N
SAN JUAN
Congrejos Pt.
Pt. Vacia Talega
Miquillo Pt.
Pt. Picua
Luquillo
Cape San Juan
Icacos Cay
Lobos Cay
Diablo Cay
Cay Palominos
Fajardo
Bayamon
Manati
Cataño
Caguas
Cidra
Humacao
Juncos
Naguabo
Yabucoa
Guayama
Arroyo
Salinas
Coamo
Barranquitas
Aibonito
Cayey
Culebra I.
Culebrita I.
Cross Cay
VIEQUES SOUND
Vieques I. (Crab I.)
Pt. Arenas
Pt. Vaca
East Pt.
Cabras I.
Pt. Candelero
Pt. Yeguas
Pt. Tuna
Pt. Viento
Pt. Figuras
Pt. Ola Grande
Jauca Is.
Barca Is.
Muertos I.
Caja de Muertos I.
VIRGIN PASSAGE
VIRGIN ISLANDS
Jost Van Dyke I.
Tortola
Great Thatch I.
Cockroach I.
St. Thomas I.
St. Thomas
Savana I.
Water I.
St. John I.
Cruz Bay
Ram Head
Buck Is.
Frenchman's Cap
VIRGIN ISLANDS (United States)
Hams Bluff
Saint Croix I. (Santa Cruz I.)
Frederiksted
South West Pt.
Long Pt.
Salt River Pt.
Christiansted
Watchhouse
Kingshill Pt.
A N S E A
ty of December 10, 1898;
nmark, January 25, 1917.
PORTO RICO
AND
THE VIRGIN ISLANDS
Statute Miles
0 5 10 20 30 40 50
Kilometers
0 5 10 20 30 40 50 75
66° 30′ Longitude West 66° from Greenwich 65° 30′ 65°
100° E 95° F

XUM

EXPLANATION

Boundaries of Countries

Boundaries of States or Provinces

Capitals of Countries ⊙ Capitals of States, Provinces or Colonies

Head of Navigation Wireless Stations Highway

Railroads, in operation

" under construction or proposed

Steamship Routes with distances in Nautical Miles

U. S. Consular Office U. S. Consular Agency

The approximate elevation of the land is indicated by color, viz:

	0 to 600 Feet
	600 " 2000 "
	2000 " 6000 "
	over 6000 "

The depth in the ocean is indicated by color, viz:

	0 to 100 Fathoms
	100 " 1000 "
	over 1000 "

XUM

LANATION

daries of Countries

daries of States or Provinces

ries ◎ Capitals of States, Provinces or Colonies

n Wireless Stations ——— Highway

uds, in operation
under construction or proposed

ship Routes with distances in Nautical Miles

Consular Office U. S. Consular Agency

vation of the color, viz:

0 to 600 Feet	
00 " 2000 "	
00 " 6000 "	
over 6000 "	

The depth in the ocean is indicated by color, viz:

	0 to 100 Fathoms
	100 " 1000 "
	over 1000 "

Morant Cays
Portland Rock
Pedro Bank
Pedro Cays
Rosalind Bank
Alice Shoal
Bajo Nuevo
Serranilla Bank
C A R I B B E
North Cay
Serrana Bank
Roncador Bank
Riohacha
Soldado
Santa Marta
Ciénaga
Puerto Colombia
(Savanilla)
Barranquilla
Aracataca
Barrancas
Cartagena
Valledupar
Calamar
Heredia
Carmen
Tolú
Corozal
Chiriguaná
Sincelejo
Since
Magangué
Mompos
Gulf of Darien
Mulatos Arch.
Panama Canal
Porto Bello
Cristobal
Colón
Panama
Balboa
Lorica
Chimu
Banco
Monteria
Tamalameque
Convención
Rio de Oro
Ocaña
Cucuta
C.Tiburon
Pearl Islands
Rey I.
San Jose
Gulf of Panama
Turbo
Pto.Cesar
Patria
Nechí
Pamplona
Cáceres
Angostura
Zaragoza
Pto. Wilches
Pto. Santos
Bucaramanga
Pen. of Azuero
C.Mala
Frailes
Ituango
Dabeiba
Lebrija
Cupica
Cañasgordas
Sopetran
Antioquia
Botero
Barbosa
Cisneros
Sto. Domingo
Pto. Berrio
Zapatoca
Barichara
Simacota
Socorro
Charala
Velez
Medellin
El Valle
Caldas
Envigado
Quibdo
Fredonia
Sonson
Chiquinquira
Sogamoso
Jurado
Garachiné
C O L O M
S O U
80°
J
75°

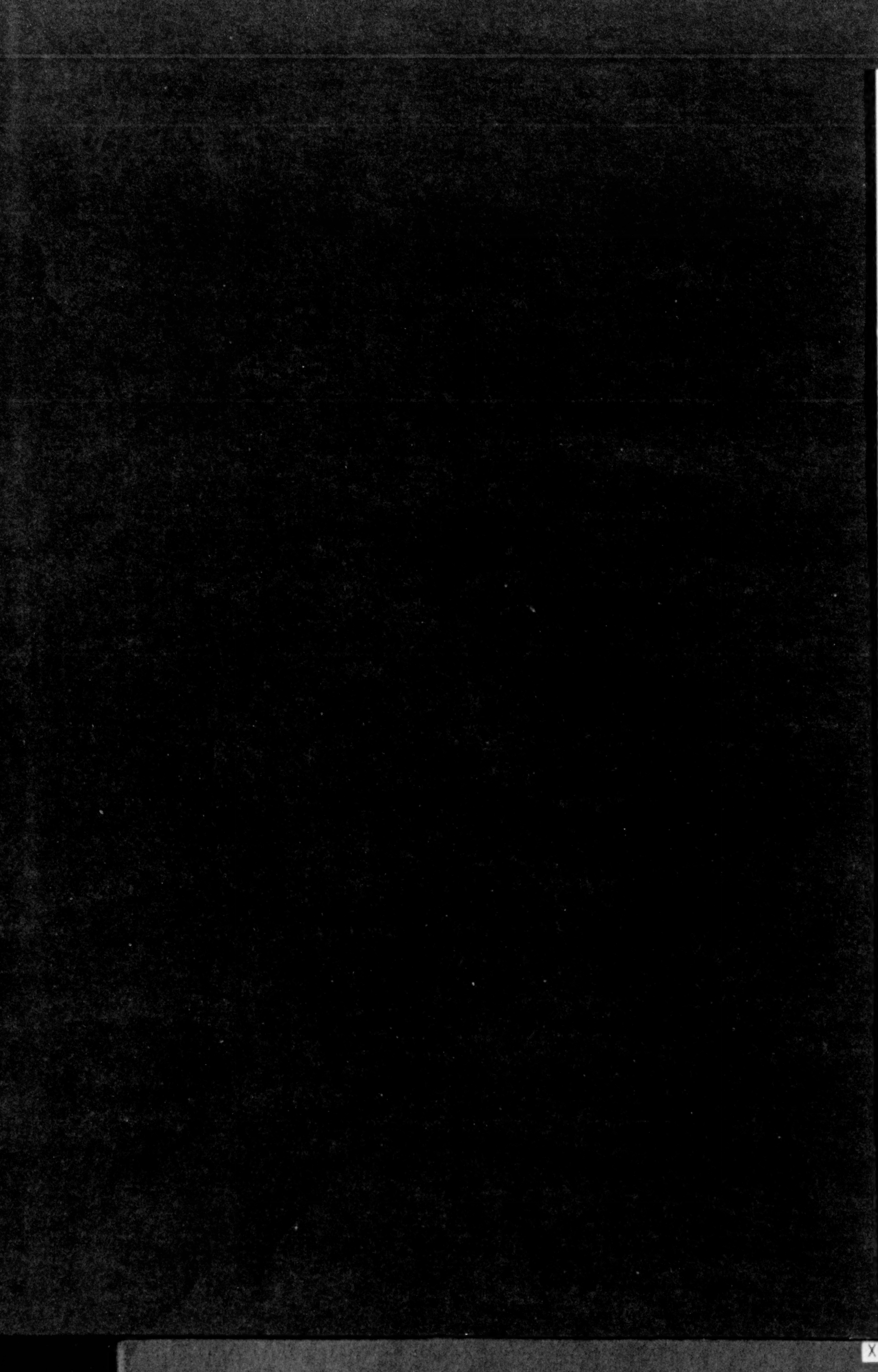
XUM

A N T I L L E S
C A R I B B E A N S E A
L. Aruba (Oruba) (Du.)
North Pt.
L. Curaçao (Du.)
L. Bonaire (Du.)
Willemstad
Little Curaçao
Laura Pt.
Los Aves
Los Roques
Pta. Gallinas
B. Honda
B. Portete
C. de la Vela
Los Manges
Pto. Estrella
C. San Roman
Espada Pt.
Goajira Peninsula
Paraguana Pen.
Medanos Isthmus
La Vela
Zamuro Pt.
Gulf of Maracaibo (G. de Venezuela)
G. de Coro
Coro
Riohacha
Capatarida
Soldado
Santa Marta
Ciénaga
Colombia
Barranquilla
Sinamaica
Alta Gracia
Maracaibo
Sta. Rita
Barrancas
Aracataca
Valledupar
Sierra de Perija
Calamar
Heredia
Lake Maracaibo
Carache
Trujillo
La Ceiba
Valera
Tocuyo
Barquisimeto
Quibor
Aroa
San Felipe
Yaritagua
Valencia
Tucacas
Palmasola
G. of Triste
Pto. Cabello
La Guaira
Caracas
Maracay
Villa de Cura
Cua
Ocumare
San Carlos
Araure
Guanare
Papelon
El Baul
Calabozo
Sombrero
Barbacoas
Magdalena
Chiriguaná
Mompos
Banco
Tamalameque
Encontrados
Sta. Barbara
El Vigia
Merida
Merida Mts.
Barinas
Nutrias
R. Apure
S. Fernando de Apure
Pto. Villamizar
Tachira
La Grita
Convencion
Rio de Oro
Ocaña
Cucuta
Tariba
San Cristobal
Rubio
Pamplona
R. Uribante
Guasdualito
Arauca
R. Arauca
Tedos los Santos
R. Capanaparo
Pto. Wilches
Pto. Santos
Bucaramanga
Lebrija
S. Andres
Zapatoca
S. Vicente
Barichara
Pto. Berrio
Chiscas
Tame
Cocuy
Simacota
Socorro
Charala
Soata
Chita
Velez
Moreno
Tamara
R. Meta
R. Casanare
R. Tomo
R. Tuparo
Atures
Malpures
Rio Orinoco
Caldas
Envigado
Somon
Chiquinquira
Sogamoso
Angostura
Zaragoza
Urbana
S O U T H A M E R I C A
C O L O M B I A
V E N E Z U E L A
75°
K
70°
L

XUM

Saintes Is.
Aves or Bird I.
Dominica (Br.)
Roseau
Martinique (Fr.)
St. Pierre
Diamond Rock
Port Castries
St. Lucia (Br.)
Soufriere Bay
C. Moulechique
WINDWARD ISLANDS
St. Vincent (Br.)
Georgetown
Kingstown
Bequia I.
Quatre I.
Canouan I.
Union I.
Carriacou
Grenadines (Br.)
Ronde I.
Grenada (Br.)
St. George
North Pt.
St. Andrews
Barbados (Br.)
Bridgetown
South Pt.
A N T I L L E S
E A
La Blanquilla
Horquilla
Los Hermanos
Grande Cay
I. Orchila
Los Testigos
Little Tobago
Tobago (Br.)
Plymouth
Scarborough
Margarita
La Asuncion
Pampatar
Coche I.
Carupano
Rio Caribe
Galera Pt.
Arima
St. David
Sangre Grande
Port of Spain
Trinidad (Br.)
Rio Claro
Paria Pen.
Pto. Piedra
Gulf of Paria
San Fernando
Brighton
Princess Town
Siparia
Galeota Pt.
La Tortuga
Cariaco
Cumana
Icacos Pt.
Serpents Mouth
C. Codera
Carenero
Guanta
Barcelona
Guapo
Aragua
Pedernales
Maturin
Delta of the Orinoco
Onoto
Aragua de Barcelona
Tucupido
Barbacoas
Tucupita
Barrancas
Barima
Sta. Maria de Ipire
Parmana
Guayana Vieja
Imataca
Soledad
Sta. Maria
Sta. Cruz
Ciudad Bolivar
Callao
Guasipati
Mapire
Orinoco
Rio
Caicara
Paragua
Cura
El Dorado
Urbana
A M E R I C A
V E N E Z U E L A
SIERRA
BRITISH G
Caura
Cerro Curapo
Cerro Chanaro
San Rafael
Mt. Roraima
Mt. Chakbang
SIERRA PACARAIMA
BRAZIL
San Vicente
15
5
10
6
5°
65°
M

UM



XUM

She's my girl and I'm her beau
Else she'd not be blushing so.
We will marry, live so gay
And have our Campbell's every day!

The big moment!

The first impression tells the story. Begin with a hearty plateful of Campbell's Ox Tail Soup and see what a glow of satisfaction goes round the table. Your guests will know there's a real dinner coming when you start with

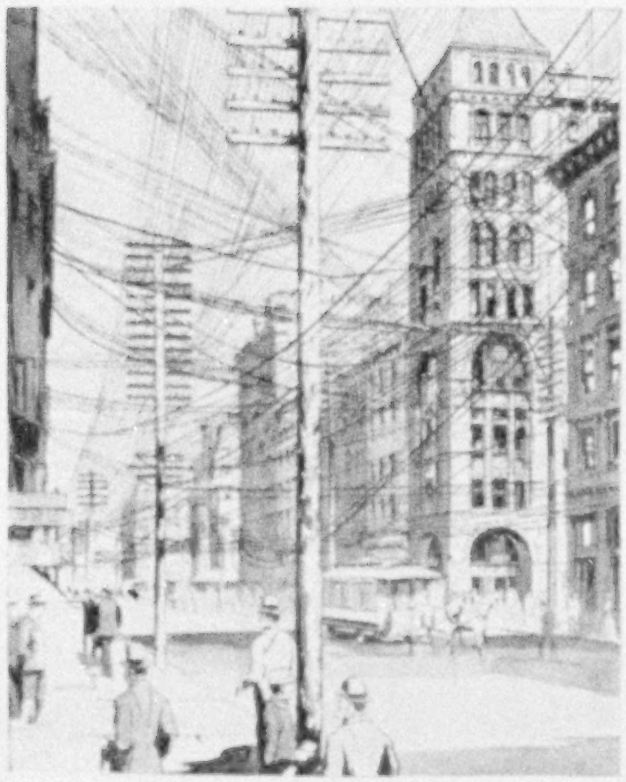
Campbell's Ox Tail Soup

It is made from selected ox tails of medium size—the best size for making soup. The sliced joints and rich strengthening broth are blended with snow-white celery, Chantenay carrots and golden turnips, choice barley, tasty leeks—just a touch of these—and delicious flavoring.

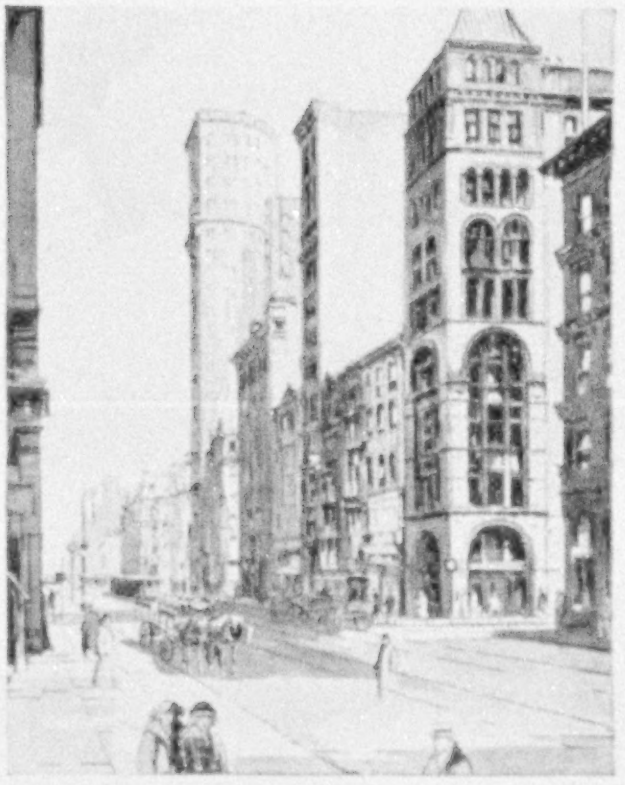
21 kinds **12 cents a can**

Campbells' Soups

LOOK FOR THE RED AND WHITE LABEL



A scene on Broadway, New York, in 1890, showing the density of overhead wires



The same scene after the overhead wires were replaced by underground cables

Improvements

The history of the telephone is a record of constant improvement. Only by numerous inventions and ceaseless research for new and better ways has the present standard been reached.

Two-score years ago the telephone could hardly carry the human voice across a city. Now it carries it distinctly across this great continent. The once familiar network of overhead wires in large cities has been replaced by systems of underground cables, each cable containing thousands of slender, sensitive wires.

Switchboards, once primitive devices, called upon to handle only a few connections and limited in their workings, have now become great and precise mechanisms through which the volume and complexity of telephone traffic is handled with mechanical perfection.

With the continued growth in the number of telephone users, there is a continued increase in the problems of speed, accuracy and speech transmission.

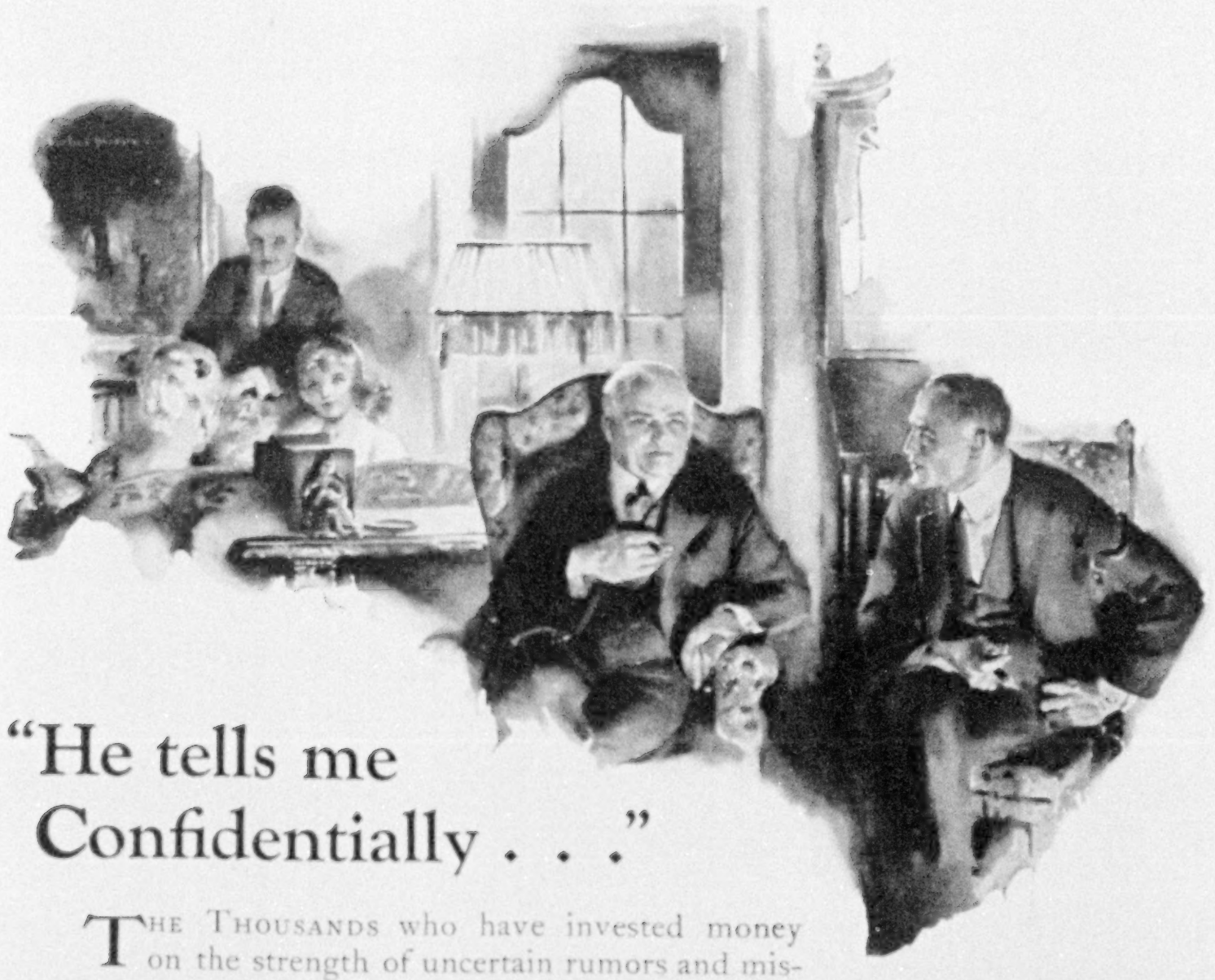
These are the problems forever before the scientists and engineers of the Bell System; and the solution of these problems, in advance of necessity, is the objective of this great body of specially trained experts.

The Bell System will continue the improvements necessary to maintain its standard of service, which is the best and cheapest telephone service in the world.

"BELL SYSTEM"
AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES

One Policy, One System, Universal Service, and all directed toward Better Service

"Mention The Geographic—It identifies you"



"He tells me Confidentially . . ."

THE THOUSANDS who have invested money on the strength of uncertain rumors and misinformation, testify to the danger of well-meant but unsound advice.

Investment information and advice, based upon careful study and long experience, can be had for the asking at any National City Company office. If there is no office in your city, your correspondence will have our best thought and attention.

Our monthly list is made up of Bonds that we have ourselves purchased and believe to be prime investments. A copy on request—sent to you monthly if you wish.

The National City Company

National City Bank Building, New York

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THE NATIONAL CITY COMPANY
NATIONAL CITY BANK BUILDING
NEW YORK

BONDS
SHORT TERM NOTES
ACCEPTANCES

WHERE QUALITY JOINS ECONOMY

GOODYEAR Cord Tires are the best tires that we know how to build. They have in them the finest materials and the finest workmanship that our experience and resources are able to command. Over a period of years, users have learned that apart from their distinction, and the superior comfort they afford, Goodyear Cord Tires actually cost less in the end.

GOODYEAR
CORD TIRES

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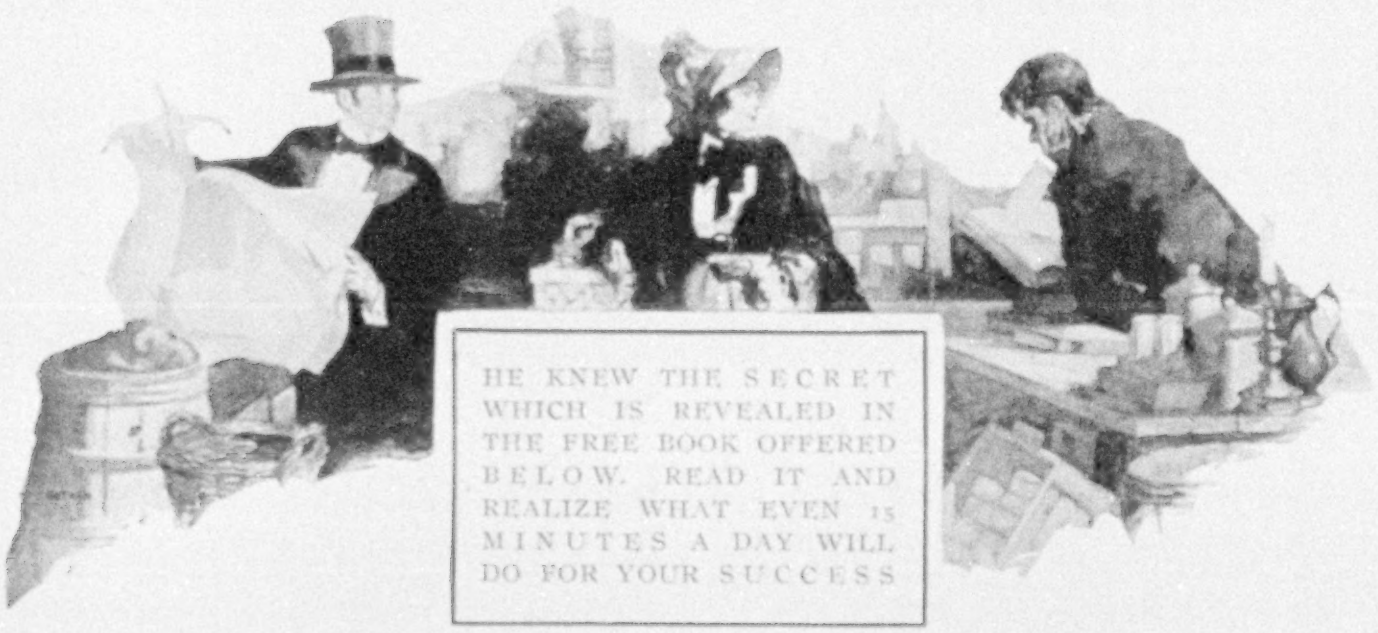
Whitman's
Quality Group
THE SAMPLER—A happy selection from ten other popular packages of Whitman's.
NUTS CHOCOLATE COVERED—For many tastes nut meats, carefully hand picked, blended with Whitman's Chocolate are the ideal confections.
PLEASURE ISLAND PACKAGE—A quaint and curious idea expressing the value of the chocolates in the symbol of a pirate's treasure chest.
A FUSSY PACKAGE—Selected chocolates with nut, caramel and other "chewey" centers. Contains no creams.
SALMAGUNDI CHOCOLATES—A medley of good things in an artistic metal box.
SUPER EXTRA CHOCOLATES—The package, containing a wide assortment, that first made Whitman's famous, back in 1842.
THE LIBRARY PACKAGE—Shaped like a book bound in hand buffed green and gold. The contents please every student of sweets.
These await your pleasure in the nearby selected store which is the Whitman agency and receives its supplies direct from Whitman's.
STEPHEN F. WHITMAN & SON, Inc.
Philadelphia, U. S. A.
Whitman's
Sampler
Whitman's
NUTS
CHOCOLATE
COVERED

The Clerk Whose NAME Will Live Forever



HE KNEW THE SECRET WHICH IS REVEALED IN THE FREE BOOK OFFERED BELOW. READ IT AND REALIZE WHAT EVEN 15 MINUTES A DAY WILL DO FOR YOUR SUCCESS

TWO men lived in the same town a century ago; they knew the same people and had an equal chance in life.

One spent all his spare hours in idle talk or with the daily paper; he knew nothing beyond the day's news. The other brought to every subject a wealth of side-light and illustration that kindled the interest of men and women, no matter where he went.

The name of the first man has long since been forgotten; the name of the other, the humble clerk in a country store, will live forever.

He talked like a man who had traveled, though his travels were confined to a few backwoods counties. He knew something of history and biography, of the work of great philosophers, poets and dramatists.

What was the secret of his wide range of knowledge? How can a man who must work every day in a routine job find time to make himself so interesting to other men and women? How can he, in odd moments, learn to think clearly and talk well?

His Secret Given to You

The answer is found in every biography, every anecdote of that *greatest* clerk. He owned a few great books and, in the odd moments between customers' calls, he read them systematically. It was the influence of those books that gave his mind its start; then lifted his eyes beyond the horizon of a backwoods town. Before he was fifty the whole nation knew the name and acknowledged the power of that humble, unschooled man. His name was Abraham Lincoln.

What are the few great mind-building books? Out of all the millions of volumes in the world, how shall a man know what and how to read? There is no more important question for you to ask yourself. It is answered in the free book offered below — a wonderfully interesting little book that tells the scope and plan of

Dr. Eliot's Five-Foot Shelf of Books

The Fascinating Path to a Liberal Education

Every well-informed man and woman should at least know something about this famous library. The free book tells about it. In a wonderfully interesting way it explains how Dr. Eliot, out of his life-time of training men for success—forty years as president of Harvard—selected the few great books that contain the essentials of *all* books—the "essentials," as he says, "of a liberal education."

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Discarding all the books that waste your time, he has combined these few great volumes into a rounded library; he has arranged them with reading courses and footnotes so that even in 15 minutes of pleasant reading a day a man may master them.

Think of it—the knowledge of literature and life, the broad cultural viewpoint that every university strives to give—these may be yours in the pleasant spare moments of your active days. Make yourself a bigger, more interesting man or woman this year. Send for "Fifteen Minutes a Day."

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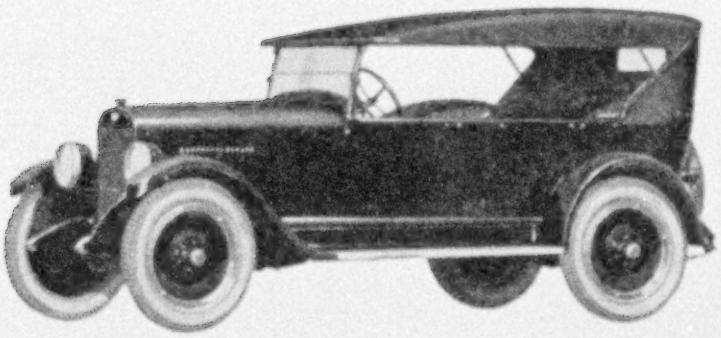

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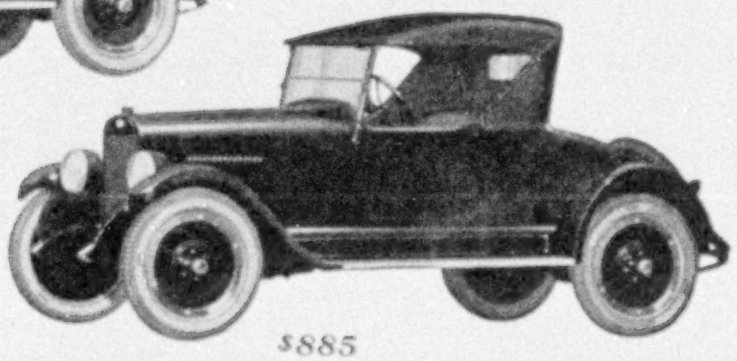

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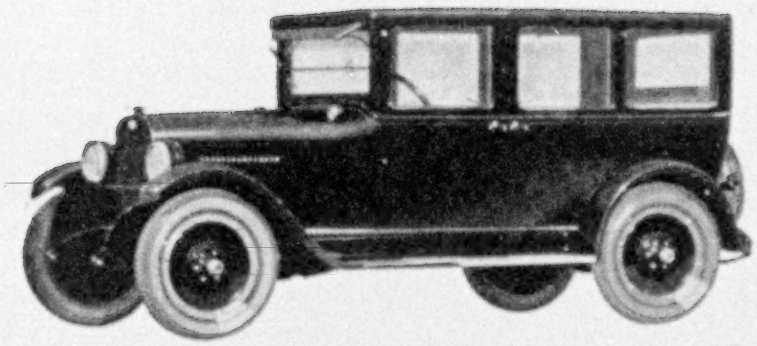

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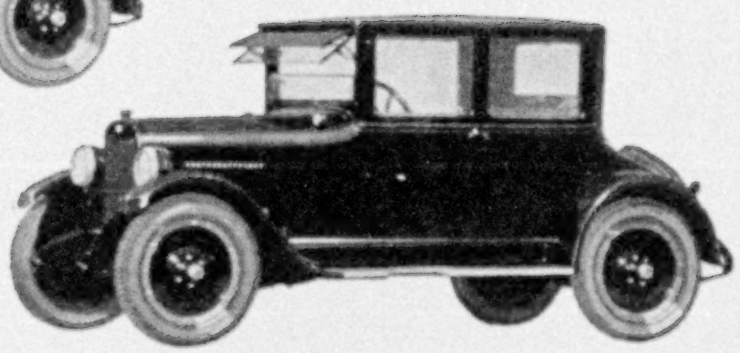

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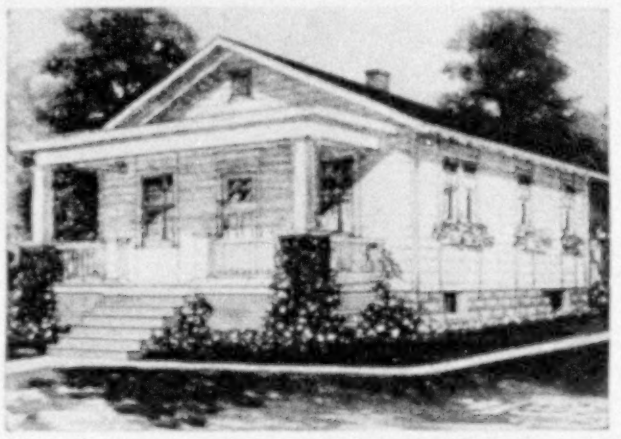

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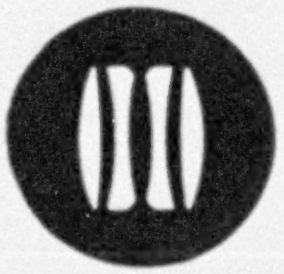

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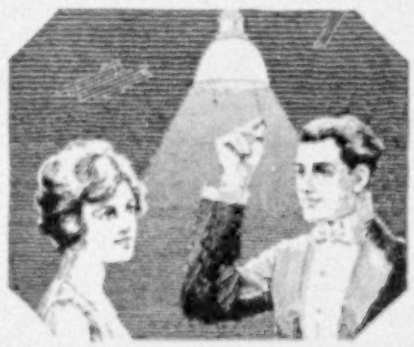

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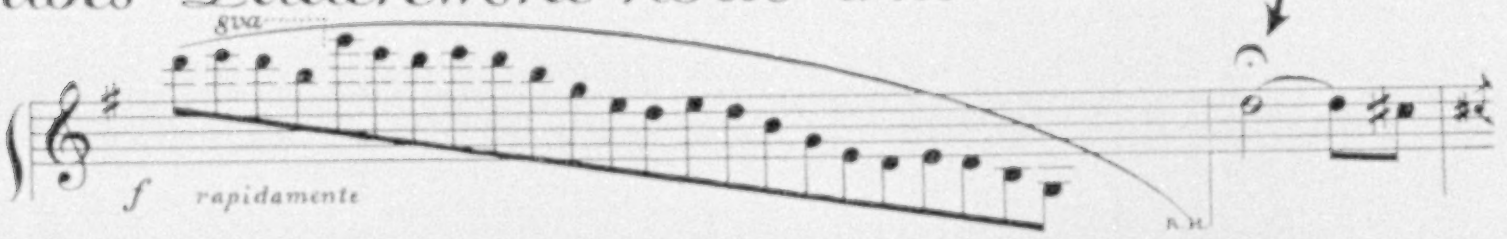

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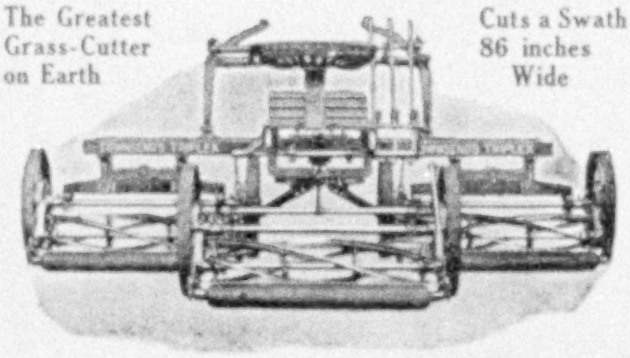

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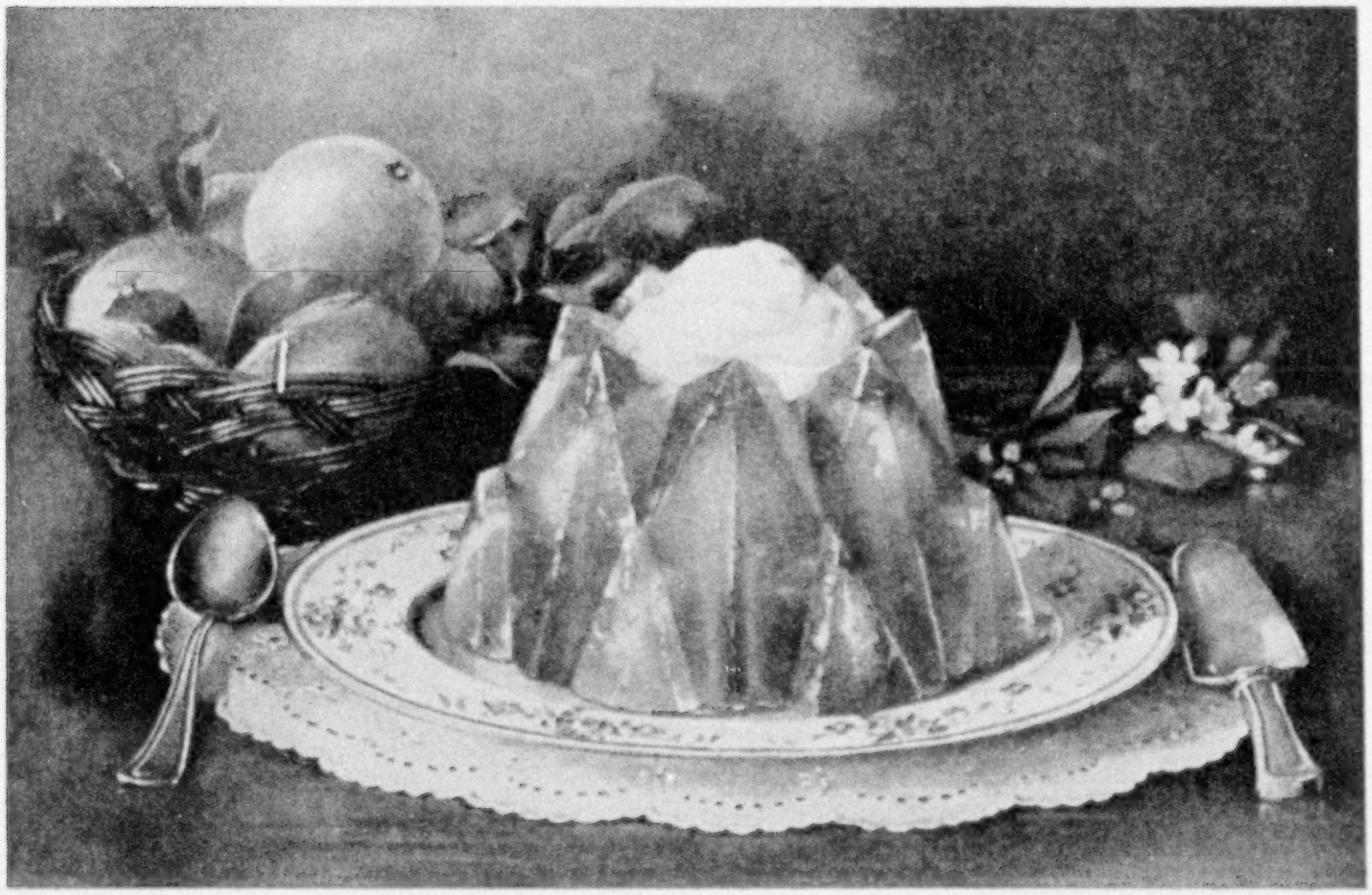

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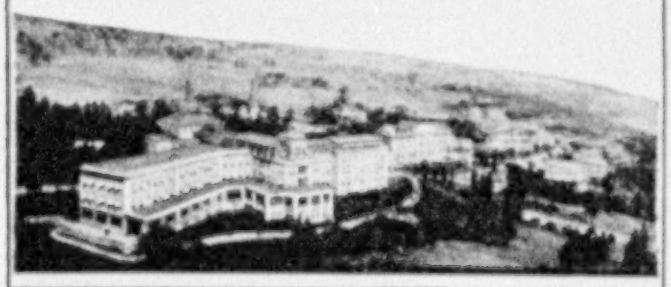

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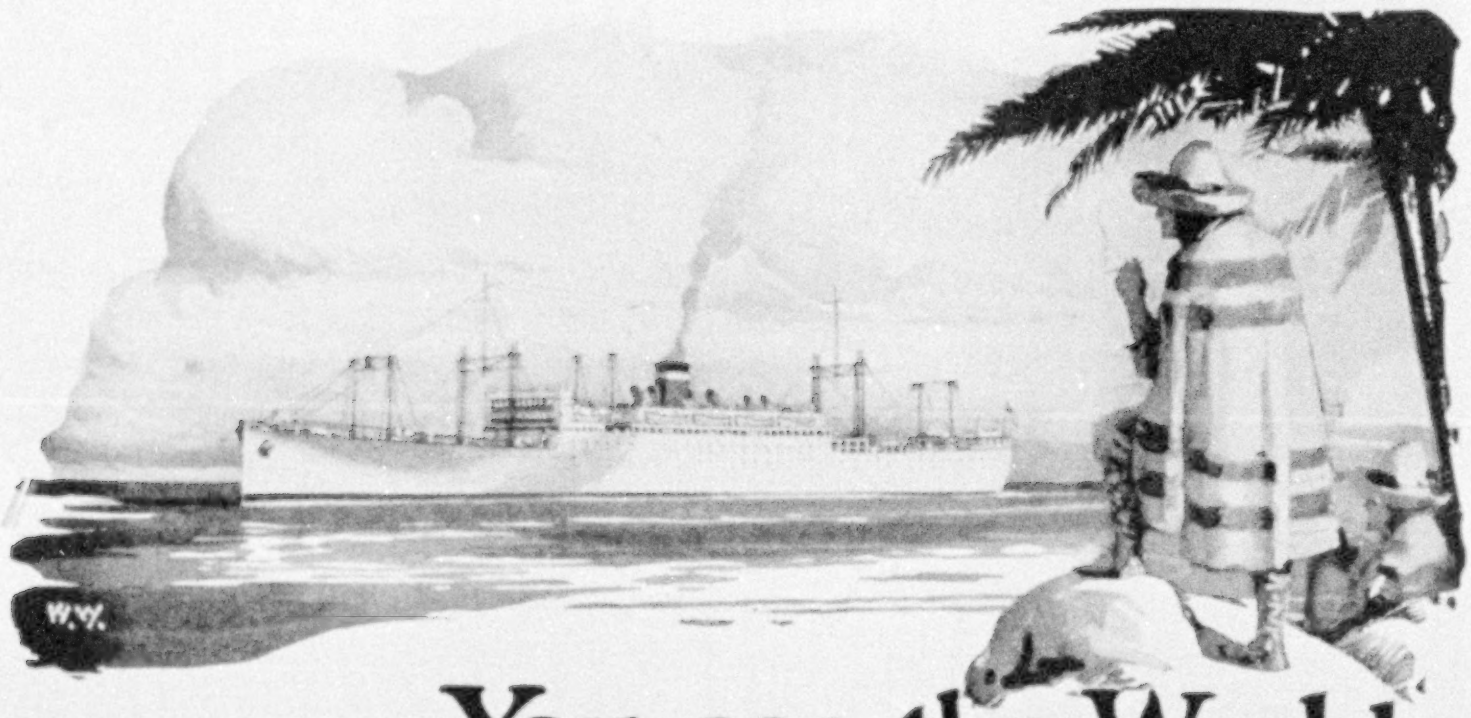

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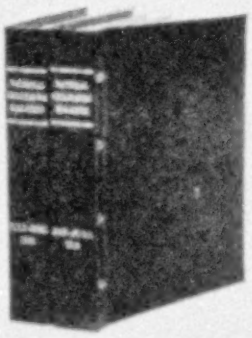

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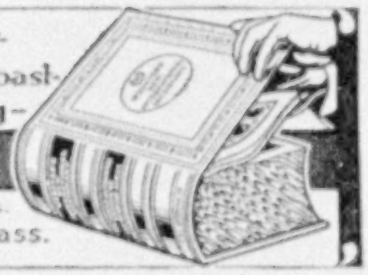

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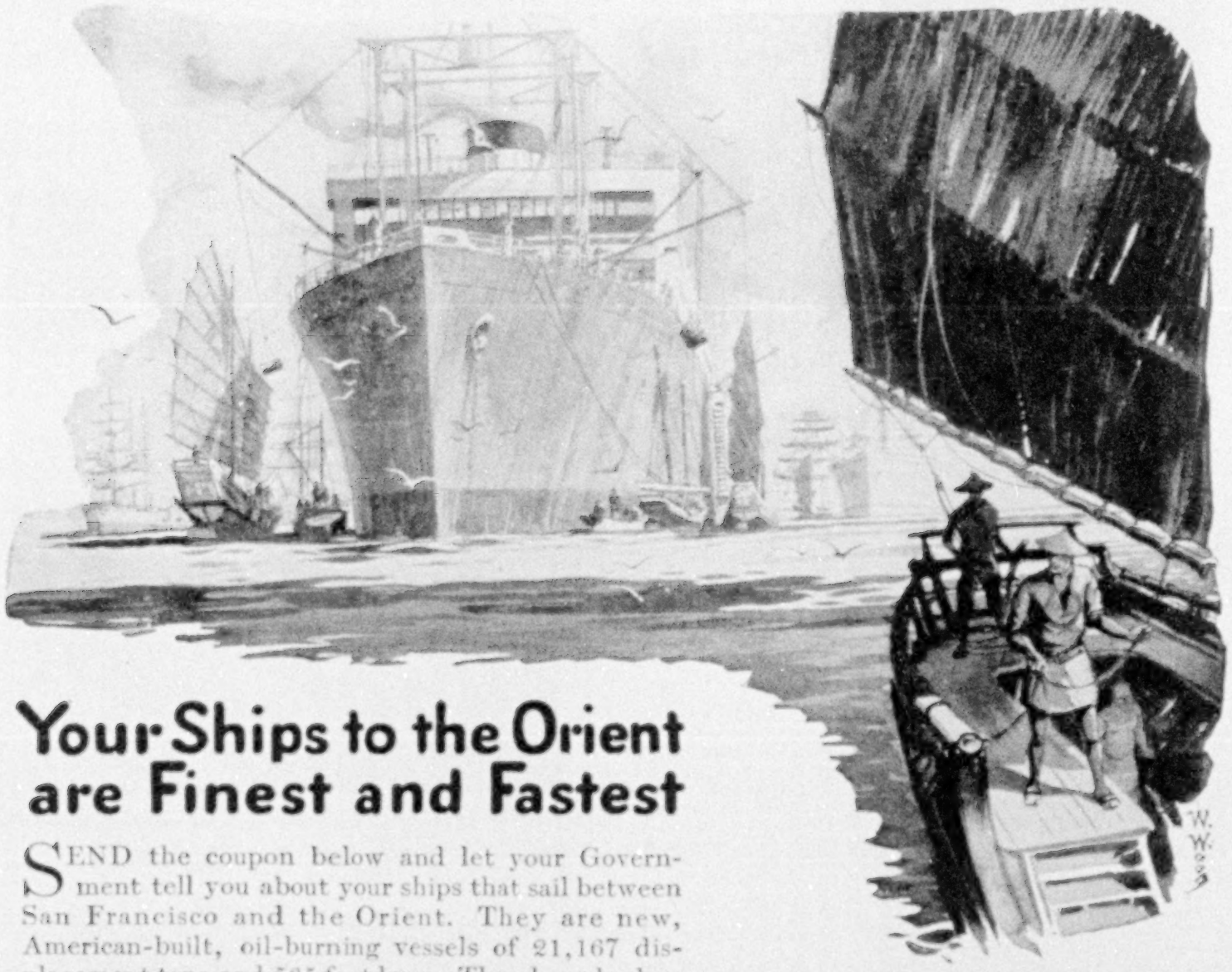

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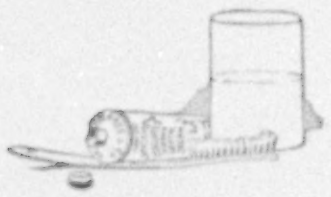
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